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ABSTRACT

This book of readings for counselors, researchers, faculty, graduate students, and policy-makers provides information regarding issues on sex fairness and sex bias in occupational interest measurement. The papers are presented in three sections, with each section prefaced by introductory comments by the editors. The first section, an introduction, contains two papers, Issues of Sex Bias and Sex-Fairness in Career Interest Measurement: Background and Current Status. The next section, on research on sex-fairness of interest inventories, presents studies grouped according to the type of scale construction method used: (1) homogeneous scales, (2) occupational scales, and (3) interests of special groups. Some representative titles included under each of these three groupings are, respectively, as follow: (1) Neutralizing Sexist Titles in Holland's Self Directed Search: What Difference Does It Make?, and Validity of Sex Balanced Interest Scales; (2) Strong Vocational Interest Blank: One Form or Two?, and Validity Generalization of the Men's Form of the Strong Vocational Interest Blank with Academically Able Women; and (3) Of Measuring the Vocational Interests of Women. The last section, on implications of recent developments, contains two papers: Implications of Recent Developments for Research in Career Interest Measurement, and Selection and Use of Career Interest Inventories. Appended materials include NIE guidelines for assessing sex bias and fairness in career interest inventories, and illustration and interpretation of these guidelines. (EM)

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Sex-Fair Interest Measurement: Research and Implications

Edited By

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April, 1978

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NOTE

Here and there in this important book of readings are references to the Institute's Education and Work Group. Under the leadership of Dr. Corinne Rieder, that Group had supported the development of this report as well as a variety of other projects in the area of sex fair counseling.

In the reorganization of the National Institute of Education, responsibility for many of the Education and Work Group projects, including this book, was transferred to our new Teaching and Learning Program. I hope readers will agree that this note of explanation rather than a revision of the already typeset text is satisfactory.

Sylvia Scribner
Associate Director
Program on Teaching and Learning

ACKNOWLEDGEMENTS

This book is the result of the cooperative efforts of four groups: The staff of the Education and Work Group at the National Institute of Education, the review committee assembled to select articles, the authors of individual articles and the editors. It is often said that such a joint effort is difficult to achieve. It has not been true in this instance: Authors who write or revised papers were very generous with their time and energy, willingly meeting short deadlines. The review panel was most helpful in providing suggestions to the editors to pursue and in their diligence in the task of selecting articles for inclusion. We also acknowledge the initiative and support for the book at the National Institute of Education through the leadership of Dr. Lois-Ellen Datta, Assistant Director for the Education and Work Group. C.B. Crump provided assistance in all phases of the project, both to the editors and authors, far beyond that required. Her personal interest in the project helped us immeasurably. Finally, the editors acknowledge the challenge and value of the learning experience provided by the task of developing the implications of the developments reported in the articles. We feel the articles have much to offer the reader; we trust the reader will reach the same conclusion.

C.K.T.

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Foreword*

On June 16, 1977 the woman photographic technician on the cover of *School Shop* joined the woman telephone installation crew leader in a telephone company advertisement in our local paper, the woman bank vice president featured in the article on the same day and the woman lobster boat captain in the poster series whose announcement arrived on the 16th. All symbolize the entry of some women into previously sex-restricted occupations. The covers of *Boys Life* have yet to feature a young man diapering a baby, but catalogs for schools of nursing and elementary education are beginning to show both men and women students, and with the enrollment of women in the armed service academies, the cover of national magazines may yet feature women admirals and generals with combat commands.

Prompted by the civil rights movement of the 1960s, which stimulated the woman's movements of the early 1970s, awareness has been growing of the almost revolutionary rate at which women are seeking paid, full-time work, and of the lack of change in the kinds of jobs these women hold and their lower earnings, relative to men. While there are now at least a few women in almost all types of work, there has been only a small increase in the proportion of women in skilled trades such as plumber, electrician or tool and die maker, and in the professional specialties such as urology and surgery in medicine, and in managerial and executive positions outside of the government.

Opinion is not unanimous on whether sex or ethnic occupational segregation (which few deny as a phenomenon) is anything about which to worry. To some, a token woman or two are enough to serve as role models for others; and a world in which occupational and social roles remain highly correlated with gender is the world in which they would want to live. For others, the principles of equal justice in life, liberty and the pursuit of happiness include achievement of a society in which what one does for a living is uncorrelated with gender, race, religion, national origin or characteristics other than abilities and interests.

Civil rights legislation now prohibits overt discrimination in recruitment, hiring and promotion, and constitutes a national commitment to equality that is without parallel in other countries. As civil rights pressures increase, however, shortages on the supply side of the

labor market are becoming barriers to achieving social goals in hiring. Attention thus is turning to the supply side. Title IX of the Education Amendments of 1972 (Public Law 92-318) already prohibits sex-biased practices in elementary and secondary schools which receive Federal funds, including hiring, access to different programs and counseling. The Education Amendments of 1976 have 16 provisions intended to achieve sex-fair outcomes in vocational preparation, including prohibition of biased counseling and guidance. Some versions of other pending legislation related to youth employment and career education include sections intended to equalize occupational exploration and preparation among young people. How effective these provisions may be in affecting supply may depend on success in reducing barriers to their full implementation.

Experience with Title IX suggests there are at least six barriers to implementing even the sex-fair counseling provisions of legislation: disagreement on values, lack of information on what the times are like, uncertainties over what constitutes sex fair counseling, lack of materials, the need for pre-service and in-service training and the possibility that early determinants of career development have long-lasting restrictive effects that may be difficult to influence solely through high school and college counseling.

(a) *Disagreement*: there is profound disagreement in the counseling and guidance community on whether counseling should follow socialization, should "keep up with the times" or should be on the leading edge of social change. While most members try at least to "keep up with the times," the push and pull of the other positions influence implementation.

By the "follow socialization" argument, if in 1977, differential socialization means women and men still have different opportunities to develop an interest in repairing carburetors, and expressing an interest in repairing carburetors is characteristic of contented auto mechanics, then there is no need to look further for non-carburetor items equally associated with satisfaction or success, but which are equally endorsed by men and women. By this argument, manipulating items, scales, norms or interpretation to achieve some group goal of equity would conflict with accepting the individual's status at a given point in time, with socialization regarded as desirable variance in occupational development.

By the "keep up with the times" argument, norm groups and information would be revised as rapidly as social changes occur. If 20 percent of all auto mechanics are women and 20 percent of all secretaries are men, the interpretative materials and norm groups would be revised to reflect this. The "keep up with the times" approach also requires current information on changes in family roles, in sources of life satisfaction and changes in

* Some material in this foreword was presented in two other papers: "Why Is a Nice Agency Like the National Institute of Education Mixed Up With Something Like Title IX Guidelines?" presented at the American Personnel and Guidance Association March 1977 convention, and "He and She: Sex Fairness in Selection and Guidance Based on Educational Testing," presented at the Third International Symposium on Educational Testing, University of Leyden, June 1977.

the workplace.

The "leading edge" argument would regard gender equality as a goal and would involve changes at the item, scale, norm and interpretative levels toward expanding awareness of how individual choices would affect personal and group achievement of this goal.

The arguments for all three approaches merit consideration. Social engineering of any kind ought to be scrutinized with care for both ends and means. The cleavages within the profession reflect cleavages among the public in values regarding men's and women's abilities, temperament, proper roles in life and in their views of a divinely intended social order.

(b) *Lack of information on what "the times" are:* If "keeping up with the times" is the rule, the times may be changing so rapidly that it is difficult to know what is happening. As an example, the National Assessment of Educational Progress reported in 1976 on occupational preparation data collected in 1974 that only 2 percent of high school women expect to be housewives. Information on what women and men do expect to be, extent of preparation of non-traditional occupations through re-training or on-the-job-training, expectations for and practice of non-traditional work and family roles comes mostly from surveys several years old, some of which provide only limited data. For example, although diversity of cultures and beliefs on these issues require disaggregated studies, most of the surveys do not permit sturdy generalization for cultural, age, sex, social class, ethnic and regional subgroups.

(c) *Uncertainties:* Opinion on what constitutes sex fair counseling is polarized in the counseling profession among two dimensions: process and outcome. Process polarizes those who believe that absence of overt barriers defines sex fairness ("In our school, girls are allowed to take shop") and those who believe that the presence of encouragement to explore non-traditional occupations defines sex-fair counseling ("In our school, girls explore what it is like to take shop for at least two years before they have to decide whether or not to enroll"). Outcome as a criterion polarizes those who believe that if the process is fair (defined by either absence of barriers or the presence of encouragement), an occupationally segregated outcome is still sex-fair, and those who believe that unless the outcomes show progress toward occupational desegregation, counseling has been sex-biased. Implementation of Title IX and the new vocational education legislation may focus on the structure (sex of counselors, access to counseling, sex fair processes and materials); Congressional intent may regard these as means to ending occupational segregation by sex, an approach falling in the active encouragement/occupational desegregation quadrant.

(d) *Lack of materials:* Occupational information,

film strips, handbooks and assessment devices that keep up with the times are scarce; and those on the leading edge of the times are even scarcer. While new materials tend to be on the leading edge with regard to encouraging exploration of non-traditional careers, there still appears to be a wider choice and greater coverage for the "follow socialization" approach than for the other approaches. Also, even among the new "leading edge" materials, it seems easier to find sex-fair materials for counseling women than for counseling men. Either way, the counselor who wants comprehensive assessment of the strengths and limitations of materials with regard to various interpretations of sex fairness might have a hard time. There is, for example, no comprehensive review of whether these materials would or would not be considered in compliance with Title IX.

(e) *Training needed:* To a certain extent, Federal laws and regulations are statements of leadership and belief. Their greatest effects may come not from the relatively few adjudicated cases of non-compliance, but rather from a consciousness-raising about inequities too long ignored. As part of consciousness-raising, a thorough knowledge of what the law says, of what would or what would not be in compliance, and a sufficient understanding of the principles so that new instances can be handled are essential. This knowledge seems as important for the counseling center whose self-review does not get critiqued by DHEW as for the center about to be visited by an Office of Civil Rights review team. Because regulations are rarely self-evident and are often dry reading, special training is usually necessary.

The Sexual Equality in Guidance Opportunities (SEGO) project led by Mary-Ellen Verheyden-Hilliard is one approach to in-service training. More seems needed. How many counseling training departments now offer a course, workshop or seminar on sex-fair counseling? Where are these listed so practicing counselors can find out what different colleges offer? Which ones, if any, have been reviewed by APGA or an accrediting group, and found likely to train counselors well enough so their work can be in compliance with Title IX and other relevant legislation?

(f) *Early influences:* There are few reports on how effective even the most assertive counseling is in encouraging non-traditional exploration. Early, incomplete studies suggest that women are entering hitherto-segregated occupations most rapidly where these fit socialized interests in nurturing and human relations. Women's enrollments in graduate schools of law and medicine are increasing more rapidly than enrollment in engineering, military training and the physical sciences. While experimental programs such as those reported by Guttentag and Bray in *Undoing Sex Stereotypes* show how to expand career interests among young children, other

research indicates that early socialization of interests may limit both self-concepts and development of precursor skills. If so, expectations regarding the magnitude of changes in occupational interests as a result of later counseling may need to be adjusted downward.

The National Institute of Education is one of several Federal agencies working to reduce these barriers. The score card is mixed. Table 1 summarizes activities planned for 1977, 1978 and 1979 with regard to each of the barriers. Funds for women's studies account for 1 to 4 percent of NIE's budget, depending on what is included. Perhaps as important as these direct awards, however, is the multiplication of NIE's research findings through cooperation with agencies authorized to support operational and demonstration programs. Table 2 outlines some of these linkages.

This book of reading on issues in sex fairness and sex bias in occupational interest measurement is intended as a contribution to these efforts. Since publication in 1975 of the NIE *Guidelines for Assessment of Sex Bias and Sex-Fairness in Career Interest Inventories* and the papers contributing to their formulation, (a) the issues have been elaborated in a Wimbledon series of articles, (b) new interpretative materials have been published, (c) research on item-level changes has led to publication of a major revision of a widely used inventory, (d) the con-

cept of exploration rather than job entry prediction as a purpose for career interest inventories has been developed, and (e) through the Office of Civil Rights and other groups concerned with sex-fair counseling, the characteristics of various interest inventories have come under increasingly close scrutiny.

The review committee, under the able leadership of Carol Kehr Tittle and Donald G. Zytowski, has sifted through this work to select those articles most clearly illustrating these developments, and equally, the points of conflict and the uncertainties.

In my opinion, these developments may have resolved many of the technical issues which loomed so large in our 1972-1974 discussions of sex-fairness in occupational interest inventories. The debate may now shift from technical grounds in instrument construction and validation to the realm of personal opinion and social preference.

It may be difficult to establish on strictly empirical grounds how significant a role changes in occupational guidance may play in occupational desegregation. Perhaps Margaret Mead's answer to a question about where to start in achieving social equality when the data do not show astounding correlations with any one approach applies to occupational interest testing also. She said, "Everywhere at once."

Lois-Ellin Datta
Assistant Director
Education and Work Group

TABLE 1

**NIE Research to Reduce Barriers to Sex Fair Counseling
(1977, 1978 and 1979 Projected Activities)**

Barrier	NIE Group	What
1. Disagreement about values	E&W Group ^a	National Study on the status of working women
2. What's happening:		
a) Studies of changing sex roles	E&W Group	Research grants on changing family roles
b) Values and practice	EE Group ^b	Research grants on occupational sex role development
3. Definitions of sex-fair counseling	E&W Group	Applied research on sex-fair testing and assessment
4. Materials and procedures for sex-fair counseling		No direct funding of materials development
5. In-service and pre-service training for counselors	E&W Group	Development of training materials of vocational education personnel responsible for extensive sex-fair counseling and preparation requirements of 1976 law.
6. Early influences on career interests	E&W Group	Applied research (TV project) to expand interests of 4-9th grade students
	E&W Group	Applied research to increase number of young women interested in and prepared for occupations requiring mathematics skills
	EE Group	Basic research on development of mathematical competencies in women

^a Education and Work Group

^b Educational Equity Group

TABLE 2

NIE Bridges Between Research and Practice Through Interagency Cooperation

Agency	Activity
1. Department of Labor o Women's Bureau o National Occupation Information System	National study on working women Cooperation on evaluation with special emphasis on sex-fair outcomes
2. Fund for the Improvement of Postsecondary Education o Counseling Service Delivery Demonstrations o Expanding explorations of non-traditional occupations	Cooperation in evaluation and in feeding forward findings of research on sex-fair career development
3. USOE/Women's Programs	Cooperation in feeding forward research findings
4. USOE/Vocational Education o Experience Based Career Education Demonstration o 18 requirements for sex-fair vocational preparation	Participation in reviewing proposals and in establishing monitoring/compliance standards for sex-fair counseling and exploration NIE support of development and testing of training materials for vocational education personnel
5. Federal Interagency Panels on Research o on Children o on Adolescents o on Adults	NIE contributes financially and participates in cross-agency research activities related to sex-fair development and occupational choice

Overview

This book continues the work of an earlier study sponsored by the National Institute of Education, *Issues of Sex Bias and Sex-Fairness in Career Interest Measurement* (Diamond, 1975). The first work contributed immeasurably to the clarification of issues and definition of research needs related to sex bias and sex-fairness in career interest inventories. In fact, the effectiveness of the earlier book can be seen in many of the studies included here. It is reasonable to ask why a second book dealing with the same topics should be published within such a short time span. As the concerned reader will recognize, the studies selected for inclusion here help to redefine research needs and in other cases show the considerable progress that the earlier guidelines and discussion stimulated.

There is some sense of urgency to continue the dialogue between researchers, counselors and policy makers which the earlier book began. We know, for example, that about three and one half million interest inventories are scored annually by the major test scoring services—including The American College Testing Program, Educational Testing Service, scoring services for the Strong-Campbell Interest Inventory and Science Research Associates—and self-scored by users of the Self Directed Search. We do not know the exact proportion of men and women in the 3.5 million users of interest inventories. As a rough guess, at least half are girls and the current questions on sex bias and sex-fairness are critical to their career decisions. Counselors who are working with newly-changed reporting procedures for interest inventory results, as a consequence of the earlier guidelines and efforts of professional associations, will find some assistance in the articles included here.

The intended audience for this book includes counselors, researchers, faculty, and graduate students interested in sex-fair assessment of interests, as well as others concerned with measurement issues. Another important group of individuals who should find the book useful are those in policy-making settings related to career education and career guidance. For example, those policy makers for each of the 50 states who are responsible for insuring sex-fairness in vocational education programs, including career education and guidance, will find the present set of articles provides an up-to-date look at the status of sex-fairness in interest measurement. Other policy makers we hope to reach are in agencies such as the Office of Civil Rights, as well as individuals concerned with Affirmative Action under Title IX. With these diverse audiences in mind, we have tried, in conjunction with a review committee, to select articles that will help to illuminate and focus the issues, present necessary caveats, and indicate the need for new developments. Graduate students and researchers will find that there is still work to be done. In the meantime, however,

the articles included here provide us with useful directions for interpretation and the development of strategies to take current limitations into account.

The review committee and members of the NIE staff from the Education and Work Group, met March 17 and 18, 1977, to select a set of articles for inclusion in the present work. Some of the criteria used in selecting articles included: the relationship of the article to issues in the original guidelines, the technical adequacy of the article and an added understanding of the issue with which it dealt in the area of career interest measurement. Another concern was that of redundancy. We tried to ensure that articles did not repeat other papers entirely, with no substantive contribution. The reader will find some overlap in materials presented, but only where it was felt the redundancy added to an understanding of the issue. The set of readings was also considered from the standpoint of whether research was missing for particular issues. This concern with areas that were incomplete in the current literature led to the commissioning of an article concerned with the legal issues, and a charge to the editors to present the implications of recent developments for interpreting career interest inventories to clients and for future research.

The book includes introductory comments by the editors for each major section. These comments follow the review committee's recommendation, based on the diversity in the set of papers and the need to identify the main issue to which each paper was related. The preview of the main sections of the book given here can serve to identify the major changes that have occurred since the first book, and also to identify problem areas that are in need of attention.

In *Part I: Introduction* there are two papers. The first paper is by the editor of the first book of readings, Esther E. Diamond, and gives an historical perspective on the issues. The work to date of NIE and professional associations is also described. The second paper was prepared by the Commission on Sex Bias in Interest Measurement of the Association for Measurement and Evaluation in Guidance. The Commission documents the responses that test publishers have made to charges of sex bias in career interest inventories. Some of the most rapid changes have occurred because of the presence of overt sexism in language and what might be termed the face validity of interest measures. In the earlier book, Mary Faith Tanney's article on face validity and sex role stereotyping summarized the major concerns in these areas, and major test publishers have responded with changes.

Part II: Research on Sex-Fairness of Interest Inventories presents studies grouped according to the type of scale construction method used: A. Homogeneous Scales, B. Occupational Scales and C. Interests of Special

groups. Using the homogeneous scales of the Self-Directed Search (SDS), Boyd shows that merely changing the sex-typed language of occupational titles does not change several outcome measures for a sample of college women. However, the revised SDS is perceived to be slightly more "equitable to both male and female occupational interests."

Rayman, and Hanson and Rayman, present the results of changing interest inventory items, reducing the number of items that show large differences in response preferences for females and males, and thereby increasing the similarity of raw score distributions for both sexes. They developed a more sex-balanced item pool and scales for the Unisex Interest Inventory (UII) and report item and scale characteristics, compared to the then-operational American College Testing Inventory (ACT-IV).

Gottfredson and Holland summarize recent changes in the SCS and Vocational Preference Inventory (VPI) and discuss issues they view as causing dissension about sex-fairness in interest measurement. Hanson, Noeth and Prediger compare four procedures for reporting the results of interest inventories based on Holland's typology: interest profiles based on raw scores, combined-sex norms, same-sex norms and opposite-sex norms. The comparisons were based on follow-up studies, relating high-point interest codes to college educational programs, and show that same-sex norms appear to have comparable validity data.

The studies of occupational scales are concerned with measures of interests that are externally-referenced. These measures provide results comparing the responses of the test-taker with those of individuals employed in each occupation for which scales are available. Johanson and Harmon provide a paradigm for analyzing sex differences on the Strong Vocational Interest Blank (SVIB). They examine 14 scales available on both the men's and women's forms and note problems in designing one form of the SVIB that would control for sex differences.

Hanson provides examples of the types of analyses at the item and scale levels that need to be undertaken to examine sex differences on the Strong Campbell Interest Inventory (SCII). The SCII is a new form of the SVIB, combining items and scale data from the earlier men's and women's forms. These analyses were carried out for new occupational groups for the SCII. Webber and Harmon provide another example of the types of analyses that can be carried out at the scale level on the SCII. They also examine the reliability and concurrent validity of the scales they constructed, to determine the effects of handling sex differences through alternative ways of constructing scales.

Borgen and Helm examine the validity of using the earlier SVIB men's form with highly able women—National Merit Scholars. They conclude that a single form of the SVIB could predict both college and career choices of women and men.

The Kuder Occupational Interest Survey (KOIS) also contains empirically developed occupational scales. Diamond describes a new guidance instrument for high school students, the Career Development Inventory (CDI), which is based on the KOIS, and presents a statistical approach to the problem of differences in sex role socialization effects. The adjustment used with the CDI is an attempt to reduce the sex differences in occupations considered for exploration.

One of the basic concerns in the earlier *Issues* book was that fewer occupational scales were available for women on several interest inventories. The action taken by publishers on this issue has been to report all scores on all scales to all test takers, regardless of sex. Now that this step has been taken, there are concerns about the validity of interpretations: How should the scores on opposite sex scales be interpreted? Johnson uses the SCII to examine the relationship between same-named occupational scales for men and women. He suggests several actions that might reduce the cross-sex interpretation problem, including changing the method of scale construction by not using the men-in-general and women-in-general groups.

The last section of Part II is concerned with the interests of special Groups. For women's interests, one issue has been the limited and sex-stereo-typed sampling of occupations in interest inventories. An earlier study by Nancy Cole (1973) is included here since there is no more recent work which can assist our thinking about strategies of interpretation. Cole's article deals with the validity of interest inventories for women in the most fundamental sense of documenting whether the structure of women's interests is similar to that of men, thereby providing the rationale to include all occupations, whether or not traditionally entered by either sex, in counseling women.

Much of the attempt to document validity in interest measurement is directed at prediction and whether or not the interest inventory provides a "hit" or match between stated or inventoried interests and college major or occupational entry. Currently there is some question whether this is a satisfactory definition of validity of interest measurement for women. And, in fact, much of the discussion of the review committee was concerned with the influence of prior experience on interest inventory results. Individual differences cannot be directly ascribed to heredity, environment or measurement artifacts (test bias); and we do know that test scores cannot

tell the causes of the scores that result. It is critical for counselors and counseled to explore the sources of the individual's present interests, aptitudes and knowledge. Taking the counseling rather than the prediction standpoint, test users should be more concerned with the "exploration validity" of the interest inventory, rather than the predictive validity. Taking this focus provides us with alternate strategies both in interpreting interest inventory results and conducting validity studies, as well as, perhaps, a better rationale for the development of new instruments.

One study was located that examined interests of minority groups as well as the interests of women. Lamb's study uses one interest inventory and shows that there did not appear to be any bias when comparing white and minority group students classified into educational majors. Also, the structure of interests of minority groups and women appeared similar, with the exception of one minority group.

Part III: Implications of Recent Developments is concerned with new directions. Implications for future research and for counselors are included, and legal and regulatory issues are also considered.

Appendices are included to provide the reader with resource materials referenced in the text. The 1974 NIE *Guidelines for Assessment of Sex Bias and Sex-Fairness in Career Interest Inventories* are included in Appendix A. Appendix B includes material that clarifies and illustrates the guidelines, and is drawn from Chapter 3 of *Sex-Fairness in Career Guidance*, part of a learning kit published by Abt Publications. The learning kit was also an outgrowth of the earlier guidelines and other projects at the National Institute of Education concerned with fairness in guidance.

The focus of the research reported in Part II is on a small number of tests. There are no articles on other instruments because we could not locate any. The main work has been done on these few instruments, but the comments and issues to which attention is drawn by

these research studies apply to all interest inventories. Any measure of career interests has followed one of these basic approaches to scale construction. Test users should carefully review all tests, interpretive materials and test manuals with the Guidelines, and in the light of the research reported here, to see how sex-fair a particular inventory may be for their purposes. The reader should also note that the research reported here does not deal in depth with technical aspects of tests as described in the American Psychological Association *Standards for Educational and Psychological Tests*. Those standards provide other criteria for evaluating tests. For criticisms and assessments of instruments according to the APA standards the reader is referred to the *Mental Measurements Yearbooks* published by Oscar Buros, as well as test reviews published in journals of the American Psychological Association and the American Personnel and Guidance Association. The guidelines on sex bias and sex-fairness are not a substitute for Federal regulations or statutes such as the Equal Employment Opportunity Commission (EEOC) selection guidelines and Title IX of the Education Amendments of 1972.

In reading the following articles and comments, the reader must take the perspective that inventory scores cannot be construed as an inherent property of the individual. The scores describe the present status of the person, arrived at through interacting with a diverse environment. Particularly for each woman's responses, we need to pay attention to the individual's framework, which includes a large number of statuses ascribed by our culture. The interest inventory score is the product of many influences and should not set limitations for the future. This suggests a humility in the use of interest inventories and strong emphasis on exploration rather than prediction from present status. Both women and men deserve no less; we need to assess our use of interest inventories and to continue to clarify the issues and needed developments for sex fair counseling and assessment.

Part I: Introduction

Editors' Notes. The first paper on the background and current status of issues of sex bias and sex-fairness in career interest measurement by Esther E. Diamond provides the link between the *Issues* book and the present work. The concept of role prejudice, as described by the economist Kenneth Boulding, is used to identify sex discrimination in occupations and to define equality. Role prejudice cannot be supported by what we know about human development, and Diamond provides an interesting review of research to substantiate this claim. The interest inventories used in counseling have been widely criticized as sex-biased. The work of professional associations, such as the Association for Measurement and Evaluation in Guidance (AMEG) and of the National Institute of Education, are described as they have brought to full development the NIE *Guidelines for Assessment of Sex Bias and Sex-Fairness in Career Interest Inventories*. Given the *Guidelines* and the current state of the art in technical development of interest inventories, Diamond also proceeds to suggest to the reader what some of the short-range, as well as long-range solutions, may be.

"A Case History of Change . . ." provides specific information to users of interest inventories on the voluntary responses of major test publishers to the NIE *Guidelines*. The AMEG Commission has actively followed-up the effect of the NIE *Guidelines* on specific interest inventories. Counselors will be curious to see if the inventory with which they work is described, as well as the extent to which the inventory has been made more "sex-fair."

Issues of Sex Bias and Sex-Fairness in Career Interest Measurement: Background and Current Status*

By

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Abstract. In this paper the factors that led to the formulation of the NIE *Guidelines for Assessment of Sex Bias and Sex-Fairness in Career Interest Inventories*—namely, the dichotomization of the world of work into “men’s work” and “women’s work” and the restricted options available to women, particularly, in career counseling—are discussed, as are the findings of recent research on male-female differences

in interest measurement. The NIE *Guidelines* are summarized briefly and the ensuing changes in interest inventories, as well as some of the problems that have emerged—including the interpretation of Title IX amendments—are reviewed. Some suggestions are offered for future research and for what counselors can do while waiting for the socialization process to catch up.

Perhaps a better term than sex bias is one employed by Kenneth Boulding (1974). “The existing division of labor at any one time,” wrote Boulding in a report on the status of women in the economics profession, “may reflect ‘role prejudice’—that is, a learning process by which certain irrelevant biological or genetic characteristics of individuals are associated with certain roles. Some genetic distinctions are significant for role performance, but many are not and yet are widely believed to be significant. These beliefs are products of a false social learning process . . .” (p. 40).

Boulding suggests as a rough guide that, where the sex distinction is completely irrelevant to role performance, role prejudice can be said to exist if there are substantial deviations from 50 percent of each sex in a given occupation, “this being assumed to be the proportion of the sexes in the total society.”

ROLE PREJUDICE IN THE LABOR FORCE

The current U.S. labor force figures do indeed reflect the existence of role prejudice. Although the number of employed women increased by 10 million between 1962 and 1974, bringing their proportion in the work force to 39 percent, and while there were substantial increases in the number of women craft workers, operatives, and nonfarm laborers, women comprise only 4.5 percent of all craft workers and 8.1 percent of nonfarm labor (Gar-

finkle, 1975). The professional occupations, as Waldman (1970) has pointed out, are “a notorious example of a field divided along sexual lines. Here, about two-thirds of all women are employed as either nurses or teachers, and even as teachers, most women teach in the primary grades while most men teach in high school (p. 12).” Nursing and elementary school teaching accounted for 46 percent of all female professionals in 1970. Men, too, are underrepresented in field of work that have traditionally been considered women’s work—secretarial services, primary school teaching, dietetics, and nursing, for example.

A nationwide study by Prediger, Roth and Noeth (1973) found that the vocational preferences of more than 50 percent of the girls in the 11th grade fell in only 3 of 25 job families—education and social services, nursing and human care, and clerical/secretarial work. Only 7 percent of 11th grade boys indicated these preferences; most of the boys preferred the technologies/trades, engineering, natural science, and business management job families.

Dichotomization of the world of work into “men’s work” and “women’s work” is based largely on traditional expectations for “appropriate” male and female behavior and interests. The definition of appropriateness is rooted in traditional sex role behavior of the past and is handed down to succeeding generations via the society in general and parents, teachers and counselors, who themselves have been the objects of a similar socialization process. Thus is the status quo perpetuated, and various psychological measurements—including interest measurement—their norms rooted in the traditional behavior of the past, predict future behavior accordingly,

* Portions of this paper were adapted from a paper presented at the Third Annual Conference and Exhibition on Measurement and Evaluation, March 18, 1976, Los Angeles, California.

and educational and vocational guidance are provided accordingly.

A QUESTION OF RESPONSIBILITY

"Well, what's wrong with that?" is a not infrequent query from colleagues. "All we're doing is reflecting reality. It's not our job to change society." This argument permits us to sit back smugly, rejecting scientific inquiry into myths, inequities and ways to improve the human condition—an attitude that would not be tolerated on the part of the medical scientist or just about any other scientific discipline.

Origin of the Differences

As behavioral scientists, it is our responsibility to question the validity of the presumed male-female differences that form the basis for the present inequitable distribution of career options. We should ask: which are genetic and which are socially generated? And granted that there are some obvious differences, how relevant are they to ability to do the work? Women bear children and lactate; men do not. No one would argue that these are very real differences, but one would be hard put to think of an occupation where bearing a child or not bearing a child is a requirement, and lactation is a requirement only for the occupation of wet nurse. To take another example: on the average, men tend to be bigger and to have greater physical strength than women. But the two distributions overlap considerably, and many men perform heavy work from which stronger women have been turned away. Moreover, with increasing mechanization, the importance of physical strength in work will decline.

Traditional differences in measured interests and abilities (boys assumed to be better in mathematics and science and in spatial relations and reasoning and to have greater interest in these areas) are also open to question. Societal expectations, differences in the way boys and girls are given instruction in the same task (see Serbin and O'Leary, 1975), differences in the way their questions are handled by parents and teachers, and differences in accessibility of and encouragement toward certain activities have severely limited the early exploratory and learning experiences of both boys and girls. Girls have generally been excluded from rough, aggressive play and from activities that are mechanical and scientific in nature, just as boys have been generally excluded from nurturing and social-service kind of activities. Even bright girls with demonstrated ability in mathematics and science have often been subtly and just as often overtly discouraged from taking advanced mathematics or physics courses.

What Studies Show

The extent to which demonstrated sex differences in ability (and, we might deduce, interests) in specific areas are cultural rather than genetic in origin is attested to by a number of studies:

1. With regard to mathematical ability, Jacklin and Maccoby (1972), cited a study conducted by Svensson in Sweden, where equality between the sexes is strongly emphasized. No clear sex differences in math ability were found.

2. Fremer, Coffman and Taylor (1968), using the College Board Scholastic Aptitude Test, found that unlike girls in the United States, who score higher on the Verbal than on the Mathematical section, girls in Britain score higher on the Mathematical section.

3. Anastasi (1973) pointed out that although boys obtain consistently higher mean scores than girls on tests of mathematical ability, there is extensive overlapping of distributions. A similar sex difference has been found in other problem-solving tasks, with a greater difference on tasks requiring a restructuring of the situation. These differences have been shown to be related to sex differences in attitudes toward problem solving and to degree of sex-role identification. Within each sex, closer identification with the masculine sex role, as indicated on a personality inventory, is associated with superior problem-solving skill. Other studies, according to Anastasi, provide evidence that "individuals exhibiting more dependency and social conformity tend to be less successful in breaking a set of restructuring elements in problem solving" (p. 8).

4. Jacklin and Maccoby (1972), while conceding some sex differences in spatial abilities, raised the question as to exactly what constitutes spatial ability. They cited studies indicating that sex differences in spatial ability have overgeneralized to analytic abilities; when both are measured separately, sex differences occur primarily in spatial and not in analytic tasks. They also cited cross-cultural differences on different kinds of spatial tasks: one team of investigators found no sex differences in Eskimos on a wide variety of spatial tasks, and linked the independence of the Eskimo women to this finding. Jacklin and Maccoby also cited a study by the Munroes of the Kenya culture; they found that the children who are the most independent are best on spatial tasks. Other cross-cultural studies, they note, link independence to higher performance on spatial tasks, both within the culture and between cultures. Still another study cited by Jacklin and Maccoby indicates that girls can be trained in spatial abilities, suggesting that an earlier lack of training may be responsible for the demonstrated sex differences.

6. Hedges and Bemis (1974) reported on a study

using the General Aptitude Test Battery (GATB), which yields assessments in nine areas, seven of which are important to the skilled trades. In two of the seven areas no sex differences were found, women excelled in four; and men excelled in one. Although the differences found were statistically significant, the authors noted, in most cases they would be of little practical significance. For example, although United States Employment Service research has found spatial reasoning to be important for many of the skilled trades, the level required exceeds an employed worker average for only one trade. Studies of seniors in high schools throughout the country showed that 67 percent of the boys and 62 percent of the girls equal or exceed this average. In other words, more than half the girls have at least the minimum amount of spatial reasoning needed for most skilled trades.

USING INTEREST INVENTORIES IN CAREER COUNSELING

Interest inventories have been used for more than half a century for career exploration—together with, of course, other relevant information about the individual's abilities, accomplishments, experiences, goals, values and needs. In the typical interest inventory, the respondent indicates his or her degree of preference for a number of occupational or occupationally-related activities, and these responses are then compared with the characteristic responses of members of an occupational criterion group or a normative group. Differential social roles and the internalization of expected sex-appropriate attitudes and behavior have, however, resulted in the tendency of men and women to respond differently to a number of items regarding a variety of occupational or occupationally-related activity preferences.

This problem was dealt with in different ways in different inventories. Almost all had separate norms, some had separate item pools and different scales for men and women, and some had a common item pool but reported to women mainly scores on those scales normed on women and to men only scores on those scales normed on men. Empirically built occupational scales were generally based on data collected from the dominant sex in the occupation, and only where there were large numbers of men and women in the occupation—large enough to provide the number necessary for a criterion group—were both male-normed and female-normed scales built.

CRITICISMS OF SEX BIAS IN INTEREST MEASUREMENT

The first clearly targeted criticism of sex bias in inter-

est inventories came in 1972, when an American Personnel and Guidance Association (APGA) convention resolution sought a moratorium on the use of the separate item pools represented by separate forms for men and women in one inventory, and the failure to offer scores on the same scales for both sexes. The matter was referred to the Association for Measurement and Evaluation in Guidance (AMEG) and assigned to that body's Commission on Sex Bias in Measurement. Criticism of other interest inventories followed; the gist of the criticism was that, notwithstanding the various differences between them, in one or more ways they all tended to limit the options of men and women, especially the latter, by implying in the way in which these options were offered (separate norms, separate forms, reporting of scores on different options for each sex) that certain occupations or occupational areas were appropriate for one sex but not for the other.

The AMEG Commission Report

The AMEG Commission report (AMEG Commission on Sex Bias in Measurement, 1973) and followup Commission activity analyzed the major interest inventories and identified various aspects of bias, to different degrees. It also recognized the basic problem that measurement could not solve by itself—the longstanding bias within society as reflected in the early stereotyping of the roles of boys and girls and the perpetuation of these stereotypes from generation to generation. A number of recommendations were made with reference to both current practice and future research—among them that, because of known differences in response rates by sex, same-sex norm groups should be considered the appropriate comparison groups.

The NIE Study

Shortly after publication of the AMEG Commission report, the National Institute of Education's (NIE) Career Education Program—later the Education and Work Group—launched a study to examine the technical and social issues related to sex bias in career interest measurement, to develop a viable set of guidelines for identification and elimination of sex bias in career interest inventories, and to make recommendations for needed research.

A senior consultant and a planning group were appointed from the fields of counseling and guidance, psychology, and test development. The group included men and women, white and non-white. They adopted the following working definition of sex bias:

Within the context of career guidance, sex bias is de-

fined as any factor that might influence a person to limit—or might cause others to limit—his or her consideration of a career solely on the basis of gender.

Their first task was to identify the issues and to locate writers who would prepare papers on them. The second was to plan for a widely representative three-day workshop in the spring of 1974, at which the papers would be discussed and from which the guidelines and the recommendations for research would be generated. The final step was the publication of the *Guidelines*, after numerous revisions based on workshop participants' comments, and of the book *Issues of Sex Bias and Sex Fairness in Career Interest Measurement* (Diamond 1975), which contained the final guidelines and the 11 papers presented at the workshop and revised in accordance with the recommendations offered there.

The *Guidelines* deal with three principal aspects of career interest inventories:

1. *The Inventory Itself.* This section stresses the need to give scores on all occupations and areas covered by the inventory to both sexes; to indicate norms composition; to reflect experiences and activities equally familiar to both sexes in the item pool, or at least to balance the number of items generally favored by each sex—within individual scales if possible; and to employ gender-neutral language in occupational titles and text.

2. *Technical Information.* This section deals with the necessity for providing adequate technical information on the rationale for separate or combined sex norms and scales and for scoring on cross-sex scales; periodic determination of the need for updating criterion groups, norms, and other relevant data; information about the distribution of suggested or implied career options; and investigation of the validity of the inventory for minority groups, differentiated by sex.

3. *Interpretive Information.* This section points out the need for interpretive materials for users and respondents to explain how to use scores resulting from separate or combined male and female norms or criterion groups; to discuss how the scores of men and women are influenced by early socialization and other environmental and cultural factors and the resulting differences in experiences; to encourage respondents to examine stereotypic "sets" toward activities and occupations and to look at all career and educational options within which their highest ranks or scores fall; to provide adequate interpretive procedures for taking into account role and experiential differences, not only for both sexes but for minority groups as well; to encourage exploratory experiences in areas where interests have not yet had a chance to develop; and to make clear that inventories provide only one kind of helpful information.

General Impact of the NIE Study

It is virtually impossible to ascertain just how far reaching the impact of the NIE project has been. The following points, however, provide some indication:

- The American Psychological Association has distributed 8,000 copies of the *Guidelines*, one free with each copy sold of their *Standards for the Use of Educational and Psychological Tests*.

- Professors of education, directors of career education resource centers, counselor educators and others have asked for enough copies for their classes.

- Hundreds of requests for the *Guidelines* have come from all of the states and from a number of foreign countries, including Canada, the United Kingdom, Australia, Belgium and New Zealand. The largest number of requests have come from colleges and universities, public school systems and individuals, in that order. Requests have also come from private and parochial schools, technical institutes, vocational services, state agencies, service organizations, women's groups, the military, business and industry, trade unions, professional organizations and government bodies.

- Not a single letter has been received by NIE criticizing the *Guidelines* as irrelevant or a waste of taxpayers' money; many expressed the feeling that such *Guidelines* were long overdue.

- The book *Issues of Sex Bias and Sex Fairness in Career Interest Measurement* is in its third printing. It, too, has been distributed widely and has been mentioned and reviewed in numerous educational publications.

- *Sex Fairness in Career Guidance: A Learning Kit* (Stebbins, Ames and Rhodes, 1975), designed to help counselors understand and apply the *Guidelines*, has been developed with NIE funding and is available for use.

- The Sex Equality in Guidance Opportunities project (SEGO) was also funded by NIE to sensitize and train leaders in every state to be aware of the many manifestations of sex bias and to help counselors and educators reverse the effects of sex-role stereotyping on young children and high school youth.

Changes In Interest Inventories

More important than the wide acceptance of and demand for the *Guidelines* and the book are the changes made and those being contemplated in interest inventories themselves. Some of these changes were already underway as an apparent result of the AMEG Commission report.

In November, 1974, more than a year after publication of its report, the AMEG Commission, in response to the NIE *Guidelines* and new perspectives on what consti-

tutes sex bias and on the related technical issues, selected for review 11 of the most commonly used interest inventories as identified by Zytowski (1974). The Commission identified seven principal areas of concern: the nature of the item pool, scale construction, groups on which the scales were based, within-scale balance by sex, score-reporting procedures, score distribution by sex and interpretive information. Publishers were notified of both positive findings and those that indicated some degree of sex bias. (A number of changes had already been made in several inventories following the Commission's original investigation. For example, the pink and blue forms of one inventory were combined into a single form with a single item pool. Scores on all scales are reported to members of both sexes. Another inventory, for which scores on selected scales normed on men were reported to women and no scores on scales normed on women were reported to men, changed its reporting routine to give scores on all scales to members of both sexes.)

Publishers' responses were heartening. Responses were received for eight of the 11 inventories, and they indicated serious concern about the problem and a number of steps already completed, underway, or in the research and study stages. The Commission findings are presented following this paper.

Title IX Regulations

Proposed Title IX regulations on sex bias were issued by the U.S. Department of Health, Education and Welfare in 1974. During the period of review and discussion that followed, the AMEG Commission on Sex Bias in Measurement, among others—reinforced by issuance of the NIE *Guidelines*—brought the problem of separate norms for each sex to the attention of the U.S. Office of Civil Rights (OCR). The Commission pointed out that combined norms could actually discourage women and men from exploring nontraditional options and that women who score higher than most other women on their own norms—thus bringing to their attention additional options—will score considerably lower on combined norms in areas where men generally score higher. The Commission asked that this be recognized in the final Title IX Regulation on counseling and appraisal. The final regulation, paragraph 86.36 (Nondiscrimination on Basis of Sex, 1975), amended from the proposed regulation, reads:

(b) *Use of Appraisal and Counseling Materials.* A recipient which uses testing or other materials for appraising or counseling students shall not use different materials for students on the basis of their sex or use materials which permit or require different treatment of students on such basis unless such

different materials cover the same occupations and interest areas and the use of such different materials is shown to be essential to eliminate sex bias. Recipients shall develop and use internal procedures for ensuring that such materials do not discriminate on the basis of sex.

The portion of the regulation beginning with "unless" represents the 1975 amendment and appears clearly to regard use of separate norms in the circumstances described as being in compliance with the regulation, in accordance with both the AMEG Commission report and the NIE *Guidelines*. This point needs to be made clear to inventory users who regard separate norms as biased.

The OCR also requires that interest inventory scores on profiles based on other-sex norms be provided to counselees whenever scores on same-sex norms are given. In the case of homogeneous scaling, two conflicting profiles often result, and counselees are advised to give major consideration to profiles based on own-sex norms. This point has been a matter of some controversy among interest inventory publishers, but has been supported by those who feel the counselee, given adequate interpretive information, has a basic "right to know" what the gender differences in measured interests are. Other-sex profiles can also serve as supporting information regarding the importance of same-sex norms.

PROBLEMS IN SEARCH OF SOLUTIONS

Obviously, even though major steps forward have been taken with regard to elimination of sex bias in interest measurement and to making available to all members of either sex all options offered by the inventory, the ideal solution is still a considerable distance away.

As Cole and Hanson (1975) pointed out, measuring the degree of similarity between an individual's likes and dislikes and those of people in a given occupation relies heavily on a stable socialization process closely tied to the past. The empirical basis of interest measurement implies prediction of future occupational group membership on the basis of similarity to the likes and dislikes characteristic of those who have been representative members of the occupational group in the past. When the future takes a new direction, departing from the status quo (as, for example, in the entry of large numbers of women into the skilled trades), this traditional prediction model impedes the path of constructive change.

Differences in Response Rates

The ideal solution may not be possible until sex-role

stereotyping is no longer reinforced and perpetuated by parental attitudes and pressures, teacher expectations, peer pressures, the school curriculum and its materials, the media and the counselor's or teacher's own life experiences, needs and values. When boys and girls, men and women, have available to them the full range of possible exploratory experiences and the full range of vocational and educational options, the responses to interest inventory items will most likely no longer show large systematic sex differences. When that time comes (and the hopeful believe it eventually will come), separate scales, separate norms, and related problems of sex bias in interest measurement will be moot issues. Men and women will be equitably distributed in the major occupational areas, and for most of these occupations norms and scales should be virtually identical and therefore easily represented by single scales that combine data from both men and women.

In the meantime, research is needed to determine which of the male-female response differences are based on general male-female role differences and which are clearly and specifically related to particular occupations. For example, in the past, craft workers, who were mainly male, endorsed many items that were primarily related to their being male rather than to their being craft workers as such. Similarly, they tended to reject items related to the traditional female role. With the entry of the female draft worker into the picture, the old prediction model no longer really works.

Item Balance by Sex Within Scales

The cleanest solution, until such time as there are no appreciable differences in item response rates by sex, would be to balance—within each scale—items generally favored by one sex with items generally favored by the other. This suggestion is frequently countered by the argument that removal of items of established validity favored by one sex and substitution of an item favored by the other sex in an effort to achieve balance might make the inventory less valid. This argument overlooks the fact that the valid item is only one sample of a given behavior out of innumerable possible samples. Surely, out there in the universe of untapped items there must be some that differentiate validly and reliably between people (men and women as well as men and women) in an occupation and people in other occupations or people in general. It should be possible—although it will undoubtedly take much time and effort—to build a test with items that are sexually balanced and at the same time meet all the requirements of test validity. As a matter of fact, a beginning has already been made by Rayman (1974), who wrote and pretested career interest items designed to measure specified interest constructs

that would at the same time be endorsed equally by males and females.

CONCLUSION

A long, slow process of change lies ahead; and we are impatient. So very much more is involved than just changing the interest inventories. Holland (1975) questioned the value of interventions to reduce occupational stereotyping; they come too late to be truly effective, he thinks. We agree that they are best introduced through appropriate preschool experiences, but the matter is not one of "either-or." Parents need to be educated so that they can accept and support appropriate preschool experiences for their children. Teachers and counselors need to become aware of their own biases and how easily, unconsciously, they can be imposed on children. Intervention, even if it occurs at less favorable times, contributes to the erosion of bias.

Waiting for the socialization process to catch up—and not doing the best with current available data in the meantime—would be extremely counterproductive. In fact, an interim course of action to be followed, while waiting for research that is planned or in progress to come up with better answers, can make a useful contribution not only to present practice but also to future research. Cole and Hanson (1975) have suggested that such a course of action involve the use of interest inventories to stimulate students to broaden the exploration process and to suggest occupations that would extend their options throughout the full range of occupational areas. They view such interim use of interest inventories as potentially less destructive than letting past socialization dominate career exploration and decision-making, confining consideration of careers to the limited range that has been traditionally acceptable.

Compensatory experiences are an additional form of intervention that may help speed up the resocialization process. The counselor might suggest tryout experiences such as minicourses or other types of hands-on exploration in areas where the student has had no previous chance to explore and now evinces an interest in doing so. This type of experience is particularly appropriate for areas where interest scores are high on own-sex norms but low on other-sex norms.

Change will come; it is inevitable. Those of us who want to see it happen can be most effective as active agents of change, striving for the time when no career will be considered atypical for anyone, whatever his or her sex or ethnic origin or other variables irrelevant to career exploration, choice or implementation.

REFERENCES

- AMEG Commission on Sex Bias in Measurement. "Report on Sex Bias in Interest Measurement," in *Measurement and Evaluation in Guidance* 6 (1973): 171-177.
- Anastasi, A. "Common Fallacies About Heridity, Environment and Human Behavior," ACT Research Report No. 58. Iowa City: American College Testing Program, 1973.
- Boulding, K.E. "Role Prejudice as an Economic Problem." From "Combating Role Prejudice and Sex Discrimination," Pt. 1 Findings of the American Economic Association Committee on the Status of Women in the Economics Profession, *American Economic Review*, December 1973. In *Monthly Labor Review* 97 (1974): 40.
- Cole, N.S., and Hanson, G.R. "Impact of Interest Inventories on Career Choice." In *Issues of Sex Bias and Sex Fairness in Career Interest Measurement*. Washington: U.S. Government Printing Office, 1975.
- Diamond, E.E., editor. *Issues of Sex Bias and Sex Fairness in Career Interest Measurement*. Washington: U.S. Government Printing Office, 1975.
- Fremer, J., Coffman, W., and Taylor, P.H. "The College Board Scholastic Aptitude Test as a Predictor of Academic Achievement in Secondary Schools in England." *Journal of Educational Measurement* 5 (1968): 235-241.
- Garfinkle, S.H. "Occupations of Women and Black Workers, 1962-1974," *Monthly Labor Review* 98 (1975): 25-35.
- Hedges, J.N. and Bemis, S.E. "Sex Stereotyping: Its Decline in Skilled Trades." *Monthly Labor Review* 97 (1974): 14-22.
- Holland, J.L. "The Use and Evaluation of Interest Inventories and Simulations." *Issues of Sex Bias and Sex Fairness in Career Interest Measurement*. Washington: U.S. Government Printing Office, 1975.
- Jacklin, C.N. and Maccoby, E.E. "Sex Differences in Intellectual Abilities: A Reassessment and a Look at Some New Explanations." Paper presented at the meeting of the American Educational Research Association, Chicago: 1972.
- Nondiscrimination on Basis of Sex*. (Rules and regulations, education programs and activities receiving or benefitting from federal financial assistance) Washington, D.C.: *Federal Register* 40 (1975): 24128-24145.
- Prediger, D.J., Roth, J.D. and Noeth, R.J. "Career Development of Youth: A Nationwide Study." *Personnel and Guidance Journal* 53 (1974): 97-104.
- Rayman, J. "Sex and the Single Interest Inventory: An Empirical Validation of Sex-Balanced Vocational Interest Inventory Items." Unpublished doctoral dissertation, The University of Iowa, 1974.
- Serbin, L.A. and O'Leary, K.D. "How Nursery Schools Teach Girls to Shut Up." *Psychology Today* 9 (1975): 57-58, 102-103.
- Stebbins, L.B., Arnes, N.L., and Rhodes, I. *Sex Fairness in Career Guidance: A Learning Kit*. Cambridge: Abt Associates, 1975.
- Waldman, E. "Women at Work: Changes in the Labor Force Activity of Women." Reprint 2677, *Monthly Labor Review* (1970): Washington: Bureau of Labor Statistics, U.S. Department of Labor.
- Zytowski, D.G. An inventory of interest and work value inventories. Unpublished manuscript, 1974. (Available from the author, Iowa State University, Ames, Iowa.)

A Case History of Change: A Review of Responses to the Challenge of Sex Bias in Career Interest Inventories*

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Abstract. The publishers of 11 popular interest inventories were surveyed for steps taken or planned to eliminate sex bias from their instruments. A number of changes have been made and research has been undertaken to determine the best way to handle the still unre-

solved technical problems. It is concluded that a concern first formulated at the level of popular opinion has been translated into professional action, public policy, and actual observable change.

In 1972, the Association for Measurement and Evaluation in Guidance (AMEG) created the AMEG Commission on Sex Bias in Measurement to investigate a specific charge of sex bias in measurement which had been referred to it by the APGA Senate (AMEG Commission Report, 1973). In 1974, the commission began to look beyond its original charge. In November of that year the executive council of AMEG charged the commission to analyze the most popular interest inventories in response to the new definitions of bias (NIE *Guidelines*, 1974; Prediger and Hanson, 1974) and new perspectives on the technical questions involved. We undertook a review of 11 popular inventories. In choosing these we were guided by "A Survey of the Use of Career Interest Inventories in Schools and Related Agencies," (Burnett, 1974, Note 1), which was made available to participants in the 1974 National Institute of Education Workshop on Sex Bias and Sex-Fairness in Career Interest Inventories. It listed the most popular interest measures based on a telephone survey of 143 city and county school systems, 52 private and parochial schools and 47 independent counseling agencies. We also included three inventories which were not on Burnett's list, because we considered them important.

The commission's reviewers concentrated on several areas of concern:

1. Were inventory scales constructed separately by

sex, by combining sex data or in some other way?

2. What groups were used in building the scales?

3. What are the norm groups?

4. Is there within-scale balance by sex?

5. Does the interpretive information deal with the question of sex differences in interest inventories, giving examples and an explanation of why the differences occur—that is, how early socialization and other factors have contributed to them?

6. Is the language used free from sex bias?

In 1975, we sent letters to publishers and developers of 11 inventories expressing our interest in learning what steps were being taken or contemplated to investigate or reduce potential sex bias in interest inventories. Responses were received from ten publishers.

In general, publishers were positive about our interest and the specific concerns we expressed. Seven of the ten respondents indicated that they are the test developers were contemplating or taking positive steps to investigate and/or eliminate sex bias in their instruments. Their responses were updated in 1977.

We decided to report what is being done for two reasons: (a) to illustrate the process of change when it involves professional, technical, social and economic considerations, and (b) to encourage readers and users to involve themselves in this process of change by interacting with test publishers directly and preparing themselves for changes in the inventories they use.

The report represents our interpretations of the publishers' written responses as we combined them into the uniform format of the report but the report should not be considered as having been "approved" or as an official statement by the inventory publishers.

*Other members of the Commission who assisted in the preparation of this report were Nancy Cole, Associate Professor of Education, University of Pittsburgh; Lenore Harmon, Assistant Vice-Chancellor, University of Wisconsin-Milwaukee, and Donald G. Zytowski, Counseling Psychologist and Professor of Psychology, Iowa State University.

TABLE 1

Status of Major Characteristics of Seven Interest Inventories

Whose Publishers Responded to AMEG Commission on Sex Bias Survey

	Item Pool	Scale Construction	Norms or Criterion	Within Scale Balance by Sex	Score Reporting Procedures	Core Distribution By Sex	Interpretive Information
ACT	A		A	A	A	A	A
HOOI	A		R			R	A
KOIS	A	R	R		A/C		A
KUDER E	A				A	C	A
MIQ	A		R		A		
OVIS			A	C	A	A	C
SCII	A	R	R		A		A

A = accomplished or no change needed.

B = research being conducted.

C = action being contemplated.

A/C = change accomplished and further action being contemplated.

OVERVIEW

Table 1 shows the seven inventories with an emphasis on change—where change has been accomplished, is currently contemplated or where research is going on. It serves as a summary of the specific types of changes related to specific inventories which are detailed later.

Table 1 indicates that most activity has been devoted to improving the quality of item pools and score reporting procedures. Thus, most of the inventories listed here have item pools that are free of generic reference and are responded to by both sexes. This is obviously an important first step. Likewise, most of the inventories give scores on all scales to both males and females, with the norm groups clearly reported. Changes in the area of non-stereotypic interpretive materials are relatively easily made and are being considered for inclusion with nearly all inventories that do not now incorporate such materials. The major area of research seems to be in scale construction and criterion groups, especially for inventories which employ scales that empirically separate occupational groups. Less research as yet has been concentrated on (a) attempting to provide scales that are item-balanced—that is, with as many items attractive to one sex as are attractive to the other—and (b) on attempting to equalize the distribution of scores on inventory scales for each sex.

THE INVENTORIES

American College Testing (ACT). The ACT Interest Inventory now reports scores on same-sex norms in order to provide equal distributions of options for men and women. Research has been undertaken (Rayman, 1976) to study the feasibility of balancing items within scales by sex. In fall 1977, the new Uni-Sex ACT Interest Inventory, which was specifically developed to have sex-balanced scales, will replace the current ACT Interest Inventory used in the ACT Assessment Program. Continuing attempts to provide non-stereotypic interpretive information are being made.

Hall Occupational Orientation Inventory (HOOI). Scholastic Testing Service, which has recently taken over the publication of the HOOI, reports that it has been collecting data from a wide variety of sources representing a cross-section of users and potential users. One objective is to determine differential scale differences for differing populations and, where differences do exist, to develop differential norms (including separate sex norms if warranted). A thorough revision of all interpretive materials, including the counselor's manual has been published.

Kuder Inventories. For both the Kuder Occupational

Interest Survey (KOIS) Form DD and the Kuder General Interest Survey Form E, items were selected primarily for their power to discriminate occupations and/or interest areas without regard for whether they contain any significant omissions for either gender.

The publisher has been gathering data to develop new criterion groups for the KOIS. The methods for forming scales permit direct comparison of the homogeneity of responses by men and women in the same occupation, and criteria exist to decide whether separate or combined gender scales are more valid. The publisher is also considering a major revision of the reporting form concurrent with the addition of new scales to increase the emphasis on the use of all types of scales with both genders. Score reporting procedures for the Kuder E and KOIS have already been revised to give each respondent scores on all scales irrespective of the gender of members of the criterion group and interpretive materials for utilizing these scores have been provided.

Differential item popularities for the genders are evident in the norms for the Kuder E. The publisher is exploring ways to monitor changes in base rate popularities of items in order that revisions of norms can be made as they are needed. They believe that the best prospect to counter the differential impact of cultural norms lies in the interpretive materials which accompany the profile reports. Recent revisions of these materials for Form E reflect the best understanding of such factors.

Minnesota Importance Questionnaire (MIQ). The 1975 edition of the MIQ eliminated the words "his men" in two of the 20 basic items and substituted "the workers" instead. Since the items in question refer to the actions of "my boss," the implication that both the boss and the workers are men is eliminated.

Research is being conducted on the relationship of Occupational Reinforcer Patterns generated by males and females in the same occupation.

Ohio Vocational Interest Survey (OVIS). Harcourt Brace Jovanovich, publisher of OVIS, plans a revision of the OVIS which will take sex-related issues into account. The tentative publication date is 1980-81. An item-analysis study to examine changes, if any, in male and female response rates is planned. Earlier item-analysis data indicated that item favorability for males and females is balanced across scales but not within scales. Differences in item response rates accounts for the decision to score 16 of the items in the OVIS item pool only for males and 16 only for females, although members of both sexes respond to all of the items.

Strong-Campbell Interest Inventory (SCII). The 1974 revision of this inventory combined the best items from the former male and female forms of the Strong Vocational Interest Blank into one item pool for both males

and females. One reporting form for both males and females on which all respondents receive scores on all scales is now available. The feasibility of combined sex scale construction is under study (Hanson, 1976) and occupational samples are being collected where samples for one sex or the other have not previously been available. A new revision of the SCII incorporating the results of this research is planned by 1980.

CONCLUSIONS

Basically a great deal of change is going on in interest measurement. The changes which can be made quickly have been made and research is underway to determine the best way to handle the still unresolved technical problems (Cole, 1974, Note 2; Johansson, 1975; Harmon, 1975). At least, those test developers and publishers whose inventories are represented in Table 1 are acting responsibly to resolve issues of potential sex bias.

We are pleased to observe that a concern which was first formulated at the level of popular opinion has been translated into professional action, public policy, and actual observable change. We find that test developers and publishers have been responsive and we have every reason to believe that they will continue to be responsive to the needs of the counselors and clients who use interest inventories.

REFERENCE NOTES

1. Burnett, F.E. "A Survey of the Use of Career Interest Inventories in Schools and Related Agencies." American Personnel and Guidance Association, Washington, unpublished report: 1974.

2. Cole, N.S. "Unresolved Technical Issues in Fair Interest Measurement." Paper presented at the American Personnel and Guidance Association Annual Meeting, New Orleans, April, 1974.

REFERENCES

- Association for Measurement and Evaluation in Guidance. "AMEG Commission Report on Sex Bias in Interest Measurement." *Measurement and Evaluation in Guidance* 6 (1973): 171-177.
- Guidelines for Assessment of Sex Bias and Sex-Fairness in Career Interest Inventories*, 1st Edition, July, 1974. Reprinted in E. Diamond, editor, *Issues of Sex Bias and Sex Fairness in Career Interest Measurement*. Washington: National Institute of Education, 1975.
- Hansen, J.C. "Exploring New Directions for Strong-Campbell Interest Inventory Occupational Scale Construction." *Journal of Vocational Behavior* 9 (1976): 147-160.
- Harmon, L.W. "Technical Aspects: Problems of Scale Development, Norms, Item Differences by Sex and Rate of Change in Occupational Group Characteristics-I." In E. Diamond, Editor, *Issues of Sex Bias and Sex Fairness in Career Interest Measurement*. Washington, National Institute of Education, 1975.
- Johansson, C. "Technical Aspects: Problems of Scale Development, Norms, Item Differences by Sex and the Rate of Change in Occupational Group Characteristics-II." In E. Diamond, Editor, *Issues of Sex Bias and Sex Fairness in Career Interest Measurement*. Washington: National Institute of Education, 1975.
- Prediger, D.J. and Hanson, G.R. "The Distinctions Between Sex Restrictiveness and Sex Bias in Interest Inventories." *Measurement and Evaluation in Guidance* 7 (1974): 96-104.
- Rayman, J.P. "Sex and the Single Interest Inventory: The Empirical Validation of Sex-Balanced Vocational Interest Inventory Items." *Journal of Counseling Psychology* 23 (1976): 239-246.

Part II: *Research on Sex-Fairness of Interest Inventories*

Editors' Notes: People, students, clients; inventory authors and publishers; interest researchers—all want sex-fair interest measurement. They probably all would prefer interest inventories that give everyone a chance to consider all possible satisfying occupational opportunities, irrespective of old ideas about who does what kind of work. The articles and papers in this part reflect the problems and progress which research has made toward this ideal.

Homogeneous Scales

One of the planks in the platform toward sex-fairness constructed by the NIE *Guidelines* is that the use of “-man” in occupational titles or the generic “he” in explanatory materials biases the inventory. Boyd's paper investigates the effects of changing such masculine tone in the Self-Directed Search, and although her subjects perceived the changed version as less biased, the results at the level of scale scores were the same for either version. This finding is a two-edged sword. Some may say that changing items doesn't help anything; others may interpret her results to show that changing the language to sex-neutrality can be achieved without damage to the measuring quality of the inventory. Since the first argument requires an assumption that women would get higher or lower scores on some scales were the language neutral, although there is no evidence to this effect, the latter interpretation is tenable. More importantly, these findings suggest that no author or publisher can be excused for using masculine-toned language or items.

It is generally known that certain items in interest inventories attract “like” or “prefer” responses in different proportions from men and women. Often, the differences are what one would expect: “adjust a carburetor” is preferred by men, and “decorate a room with flowers” tends to be endorsed by women. But what of items like, “clean and oil a sewing machine,” or “choose a shirt to match a new suit”? The latter pair of items, reflecting similar activities to the first pair, might be endorsed in substantially different proportions. Can items be written which have relatively equal, high or low rates of endorsement by the genders and also be attached or weighted on a scale in a set? Rayman has succeeded in doing so, and in his article with Hanson, has shown that such items, when formed into the scales of the ACT Interest Inventory (UniACT), are as good or valid as the old items (which Prediger and Hanson have called sex-restrictive because of their different rates of endorsement by the genders).

Gottfredson and Holland have in the past taken a relatively conservative stance toward the change of interest measures to achieve sex-fairness, arguing that definitions of sex bias and sex-fairness are not explicit enough, and that there are varied

methods of interest measurement and reporting, and different effects of inventory-taking which must be taken into account in assessing whether a given interest inventory is sex-fair. Their paper elaborates on these topics, and devote a considerable attention to the matter of sex differences in response rates, which Rayman found could be moderated. They argue that reducing sex differences in response rates will decrease the concurrent validity of an inventory—that is, reduce its effectiveness in correctly identifying persons who are already in occupational roles, a popular way of demonstrating validity. But it will, they admit, increase the validity of the inventory when the goal is to suggest possible occupations, or to increase the number of occupations explored.

Another of Gottfredson's and Holland's arguments concerns assessing the validity of inventories. One method of representing validity is by accuracy of classification, but there is no single, accepted method of converting scores into occupational possibilities, and the procedures used to determine the effectiveness of these methods, can affect the interpretation of one's data quite a lot. They cite Hanson, Noeth's and Prediger's use of unweighted percentages of correct identifications as inappropriate. However, the latter authors use that single method to compare the effects of un-normed, own-gender normed and combined sexes norm groups. They find that same sex norms suggest a greater variety of options to males and females, compared with un-normed or combined norms, thus demonstrating the utility of different treatments when the items are not equally popular with the sexes. They also demonstrate that with the ACT inventory, reporting occupations which the person should consider from scales normed on the opposite gender does not yield a high validity figure.

Occupational Scales

Sex differences in response rates were the cause of Strong's development of a separate form of his Vocational Interest Blank for women. The male and female forms of this inventory historically had only a little more than half of their items in common. Campbell did merge the forms with the Strong-Campbell Interest Inventory (SCII) in 1974, but the scales for men and women use different items for the most part even in the same occupation. Johansson and Harmon analyze these sex differences in response rates in different modes—differences between men and women in general, differences between men and women in the same occupation and differences between men in an occupation and men in general and women in the same occupation and women in general. They found that men and women in the same occupation differed substantially on 42 percent of the common items, but that most of these items were not

weighted on their occupational scale. Nevertheless, they suggest building combined gender occupational scales, with a combined gender reference group. This method would have the effect of excluding items which men and women respond to differently but which are not occupationally valid of differentiating.

Hanson's paper traces sex differences in response rates from the item level through to homogeneous and to occupational scales for men and women in each of five occupations. She finds that male-female differences in response rates vary quite unpredictably from one occupation to another, so that no one procedure for dealing with differences can be applied to persons in all occupations.

Nevertheless, Webber and Harmon compared attempts to eliminate the effects of sex differences by constructing scales for two occupational groups in the three ways: one in the traditional Strong Blank methodology, with separate male and female norm groups, another using a combined group of men and women in two occupations and a third using items which differentiated men and women in the same occupation from men and women in general, but not from each other. They were able to test the scales for test-retest reliability, and for how well the scales differentiated persons in the occupation from various groups of persons not in the occupation in question. Surprisingly, results were not the same for men and women in the same occupations—women were better differentiated from the various general groups when they were scored on combined sex scales, while men were differentiated better by scales constructed only on their own gender contrasts with men in general. Unfortunately, the authors concentrated their research on two traditionally male occupations, veterinarian and life insurance agents. One would wonder what findings they might have obtained had they used elementary teachers or nurses as another contrast group. The best conclusion which can be made from Webber and Harmon's work is that ways of treating the genders identically and still getting valid results using the Strong Blank still awaits discovery.

Whether a single form of the Strong Blank could serve as well for women and men was the question asked by Borgen's and Helm's research. Note that they used the male form of the Blank for both men and women, but essentially used the scores from this form in a discriminant function analysis to predict career and college major. Thus they were not using single or a few scores, as the counselor would, but a weighted composite of all the scores which maximized the co-variance between the scores and the major or occupational group. They found also, similarly as did Cole, that the structure of men's and women's interests do not differ appreciably. However, they found differences within occupational or major groups which they conclude will make it difficult to construct sex-free (combined sex-group normed) scales. Sex differences appear within some occupations and not within others; the differences are not constant.

A serious problem with the externally-referenced, occupationally scaled inventories is that they have never included as many scales normed on female groups as they have for males. Given Borgen's, Helm's and Cole's assurance that the structure of occupational interests is the same for both genders, researchers have intuitively sought to determine whether a scale normed on one gender may be interpreted to the other gender, knowing that there are large sex differences in response rates.

There are two questions to be answered before this can be decided: one is whether scales formed on male and female criterion groups in the same occupations are highly correlated (whether the groups have the same interests), and the other is how to deal with the difference in the mean scores of a group of one gender on their own gender-scale and the same occupation's other-gender scale. Diamond shows a way of adjusting scores on a scale or scales normed on the other gender from the inventory-taker's scores on the scales for the same occupation normed on both genders. She concludes from her analysis of scores on same-named scales that the correlations are sufficiently high to warrant such a procedure for the Kuder Occupational Interest Survey. Another way to deal with the typical sex difference in scores on the female and male normed sets of scales is to use the scores to rank order the scales within the set. Zytowski and Laing in an unpublished paper* have shown this procedure to produce results of equal predictive validity whether the scales used this way are normed on own or other gender groups. That is, among persons who were employed in the occupations for which there are both male and female normed scales, either scale, when converted to a rank, was as predictive of what occupation the person was in as the other-gender normed scale.

Johnson's findings for the Strong-Campbell Interest Inventory are essentially to the contrary. He finds the correlations between same-named own- and other-gender normed scales too low to suggest using the other-gender normed scale to estimate a person's score on a missing own-gender normed scale. More particularly, he finds a variable difference between own- and other-gender normed scales in the scores earned on the set of same-named occupations, which, more often than not, are higher on the other-gender normed scale. Since the SCII uses absolute levels of scores to decide whether an occupation merits serious consideration, this error would likely give a number of false leads. Because the difference is variable from scale to scale, and depends upon, according to Creaser and Carsello (1976) and Lunneborg (1975), the inventory taker's amount of sex-typical interest in each scale, no adjustment such as Diamond's can be made.

Campbell (1977) suggests in the SCII manual that the avenue to estimating levels of interest similarity to occupations not available on the profile is via the configuration of General Occupational Themes (GOT) and the use of Holland's (1977)

Occupations Finder. That is, he suggests that a three-letter code be developed from the highest scores on the GOT, or by averaging the scores within each field on the homogeneous Basic Interest Scales to represent the person's interests. This code can then be used in the same way it is in the SDS to suggest occupational possibilities to consider which are not limited by the scales available on the SCII profile for the person's gender.

Interests of Special Groups

It appears that the structure of women's interests is the same as that of men, but that differences in rates of item popularity are so great at present that they preclude constructing combined scales. Is it possible that other groups have such culturally-shaped experiences as to also require their own scales? Such a requirement extended to all the ethnic, religious and otherwise identifiable group affiliations would probably make interest inventorying too complex to be practical. Fortunately, the findings of Lamb on the interests (not within same occupations, but in general) of persons in a number of minority groups in the United States suggest that their differences in interests are not so great as to warrant separate treatment. Male and female differences are largest; comparatively, differences in other groups are small. But, some of Lamb's conclusions are based on very small groups, with

very wide categories for "hits," such as the black males in art. What is more, the criterion is expressed choices, and longitudinal studies are required to ascertain that these choices are acted upon in the course of their post-secondary education. It also remains to be seen whether differences between groups appear at the level of occupational scales. Further research will have to clarify this matter for counselors.

REFERENCE NOTE

- * Zytowski, D.G. and Laing, J. "Predictive Validity of Same-Named Scales on the Kuder Occupational Interest Survey." Ames: Iowa State University, unpublished paper, 1977.

REFERENCES

- Campbell, D.P. *Manual, Strong-Campbell Interest Inventory.* Stanford: Stanford University Press, second edition, (1977).
- Creaser, J. and Carsello, C. "Comparability of Cross-Sex Scores on the Strong-Campbell Interest Inventory." *Journal of Counseling Psychology* 23 (1976): 260-264.
- Holland, J. *The Occupations Finder.* Palo Alto: Consulting Psychologists Press, 1977.
- Lunneborg, P. "Interpreting Other-Sex Scores on the Strong-Campbell Interest Inventory." *Journal of Counseling Psychology* 22 (1975): 494-499.

A. HOMOGENOUS SCALES

Neutralizing Sexist Titles in Holland's Self-Directed Search: What Difference Does It Make?

By

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Abstract. Sex-role stereotyping in the linguistic structure of Holland's Self-Directed Search (SDS) was examined. A revised SDS was constructed involving the removal of all masculine-toned terminology from the items and test-taking instructions, as well as the affixing of the letters M/F and F/M to all occupational titles and terms commonly perceived as gender specific. Subjects were 266 lower division female students at large state university; 133 subjects completed the revised form. Following SDS assessment, subjects rated their inventory with respect to perceived sexual equality. Comparison variables included:

daydreams, occupations' scores, summary codes, and subsequent occupational choices. Occupational choices at each stage of the assessment process were classified as nontraditional or traditional choices for women. Results indicated that across all indices derived from the standard and revised versions of the SDS, there were no significant differences in these subjects' performance. The subjects did perceive the two inventories differently, with subjects completing the standard SDS viewing it as slightly less equitable.

The basic purposes of interest measurement are rarely disputed issues. Holland (1974) concluded that such testing ideally provides occupational predictions of satisfaction and achievement; supplies the full range of vocational options by field and level; contributes to meaningful relationships with educational and occupational information; and supplies information in accordance with the person's life circumstances without regard to age, race, sex, and social status. However, present-day critics of vocational interest measures (Birk, 1974; Harmon, 1973; Huth, 1973; Schlossberg and Goodman, 1972; Tittle, 1973) question whether current interest measures meet these criteria, particularly with regard to females.

Two areas of alleged sexism in interest measurement have been noted. The first relates to the technical aspects of measurement which have been examined in terms of the following dimensions: item selection, criterion and norming groups, item content, test instructions, as well as format and content of manuals and auxiliary materials which typically portray the male and female in stereotypic vocational roles (Birk, 1974; Harmon, 1973; Tanney, 1974; Tittle, 1973). The second area involves aspects of "cultural set" and has been studied most extensively in terms of counselor bias in the administration and interpretation of assessment measures (Broverman, Vogel, Broverman, Clarkson and Rosenkrantz, 1972; Pietrofesa and Schlossberg, 1970; Thomas and Stewart, 1971).

Numerous references have been cited as to the presumed negative effects of the pervasive use of the masculine gender to the exclusive stereotypic representation of the female gender in vocational choice instru-

mentation. However, only one investigation (Gottfredson, *Measurement and Evaluation in Guidance*, in press) has been reported on this aspect of vocational choice assessment.

The present research examines whether the neutralization of gender specific occupational titles and test-taking instructions is associated with significantly different outcomes among female test-takers. Hypotheses concerned (a) differences in female subjects' vocational preferences as a function of the linguistic structure of the standard and revised SDS inventories, (b) the frequency of nontraditional and traditional occupational choices listed per inventory at each stage of the assessment process, and (c) the subjects' evaluation of the standard and revised SDS inventories with respect to perceived sexual equality of the two forms.

METHOD

Subjects. Subjects were 266 college women enrolled in lower division courses offered by the Department of Psychology in a large state university. Their mean age was 18.7 with a standard deviation of 2.4 years. Ninety-nine percent of the subjects were Caucasian females with Blacks and Orientals comprising the remaining 1 percent.

The Self-Directed Search. Holland's Self-Directed Search (SDS) for Educational and Vocational Planning (1970) constitutes the basis for the present research. The purpose of this instrument is to assist persons in determining their interest patterns, and to suggest suitable work environments. Holland (1971) reported reliability

coefficients (KR 20) for subscales of the SDS for samples of men and women ranging from .53 to .87.

The format of the SDS consists of two separate booklets—the Assessment Booklet and the Occupations Finder. In the Assessment Booklet, subjects record their occupational daydreams, activities, competencies, occupations, and self-estimates—resulting in the determination of a three letter summary code.

The second phase of the assessment process consists of using the three letter code and permutations thereof to locate similar occupations from the list of occupational titles appearing in the Occupations Finder booklet. For Holland (1971) vocational choice is conceptualized as consisting of six types of personal orientations (RIASEC) and six paralleling work environments. The work environments are defined by elements descriptive of the six personal orientations.

Revised Self-Directed Search. The revised form of the SDS neutralized occupational titles perceived as masculine. During the process of revision two issues arose: (1) how to reword terms containing the word "man" or "master" and maintain the generic significance of the terms, and (2) how to reduce the gender-specific connotation of occupational titles not bearing the term "man" or "woman," yet due to the preponderance of a single sex in a given occupation, are commonly perceived as masculine or feminine pursuits. The occupations of school teacher and carpenter are examples of this issue. With respect to masculine terminology, revisions were made, where applicable, that corresponded to the 1973 Bureau of the Census revised occupational classification system. In order to reduce the indirect masculine or feminine tone of occupations such as carpenter and teacher, the letters F/M or M/F in alternating fashion were affixed to all occupational titles appearing in the Assessment and Occupations Finder booklets. Instructions stated that the letters M/F and F/M designated the terms male/female. In all phases of the test-taking instructions in both the Assessment and Occupations Finder booklets, masculine pronouns were changed either to plural form (them) or to refer to both sexes (him/her). Otherwise, the two forms were identical in content, form and appearance.

Questionnaire. A two-item questionnaire was administered to all subjects immediately following the completion of either the standard or the revised SDS. Item (a) of the questionnaire assessed the subjects' first listed occupational choice upon completing the SDS inventories, and is referred to in the present research as the subjects' subsequent occupational choice. Item (b) assessed the subjects' evaluation of their SDS via a five-point Likert scale with respect to perceived sexual equality.

Traditional-Nontraditional Occupations. Occupa-

tional choices at each stage of the assessment process were classified as nontraditional or traditional choices for women. These stages included: initial daydream, pooled daydreams, occupational choices from the Finder booklet, and subsequent occupational choice as indicated on the post SDS assessment questionnaire. Nontraditional occupations for women were defined as any occupation in which fewer than one-third of the labor force was female. This figure was adopted from the research of Almquist and Angrist (1970) who employed it on the basis that women constitute one-third of the total labor force. Percentage distributions for women employees per occupation were obtained from two sources: (1) the U.S. Census of the Population (1960) and (2) the Economic Report of the President (1973).

Procedure. Subjects completed their SDS forms and questionnaires, respectively, in a one hour session in groups of 10. The subjects were monitored in small groups in order to reduce error rates. The provision of testing and monitoring small groups of subjects at a given time, followed the findings of previous research (Christensen, Gelso, Williams and Sedlacek, 1975).

SDS standard and revised forms were distributed in alternating fashion as subjects entered the testing area. Alternating the distribution of the two forms achieved the degree of randomization necessitated by the post-test only experimental design.

For 61 (23 percent) of the subjects, their summary codes consisted of more than three letters due to ties. To simplify comparisons, ties were reduced to three letter codes via Davies' (1971) tie-breaking rules. For 16 subjects (6 percent), their summary codes were not listed in the Occupations Finder. Nonlisted codes typically consisted of the letters S/A/R in various combinations. These subjects were deleted from analyses whenever summary code data were involved.

In the present research the subject's first listed daydream—and presumably most recent occupational preference—is described subsequently as the "initial" daydream. For some of the analyses, all three of the subject's daydreams are included, and are described as the pooled daydream occupational preferences. In both instances, daydream occupational preferences are elicited as the first step in completion of the standard and revised forms. Subsequent occupational preference is described as the subject's statement of occupational preference as listed on the questionnaire administered following completion of the SDS.

Previous research (Holland, 1973) attests to the tendency of nonrepresentative samples such as college students, in comparison to people in general, to produce abnormal distributions for the six personal/environmental types. According to Holland (1973), the classification scheme (RIASEC) may be contracted or

TABLE 1
High Point Codes of Occupational Choices
Standard and Revised SDS Form

Form	Initial Daydream High Point Code					Total
	R/I	A	S	E	C	
Standard SDS	32	24	61	13	3	133
Revised SDS	39	16	65	8	5	133
Total	71	40	126	21	8	266

$\chi^2(4) = 7.72, p > .05$

Occupations Subscale High Point Code

Form	R/I	A	S	E	C	Total
Standard SDS	21	31	69	4	8	133
Revised SDS	19	29	77	4	4	133
Total	40	60	146	8	12	266

$\chi^2(4) = 4.45, p > .05$

SDS Summary High Point Code

Form	R	I	A	S	E	C	Total
Standard SDS	1	19	15	85	6	7	133
Revised SDS	1	15	21	89	2	5	133
Total	2	34	36	174	8	12	266

$\chi^2(5) = 6.67, p > .05$

Subsequent Choice High Point Code

Form	R/I	A	S	E	C	Total
Standard SDS	33	22	64	12	2	133
Revised SDS	32	17	66	13	5	133
Total	65	39	130	25	7	266

$\chi^2(4) = 6.39, p > .05$

TABLE 2
Means, Standard Deviations, and *t* for
Total Occupations, Nontraditional Occupations,
and Perceived Sexual Equality

	Standard SDS	Revised SDS
Total occupations listed		
<i>n</i>	117	115
<i>M</i>	11.24	9.70
<i>SD</i>	7.14	6.07
<i>t</i>	1.75	
$p > .05$		
Nontraditional occupations listed		
<i>n</i>	117	115
<i>M</i>	4.17	3.82
<i>SD</i>	3.64	3.38
<i>t</i>	.77	
$p > .05$		
Perceived sexual equality		
<i>n</i>	133	133
<i>M</i>	1.95	1.76
<i>SD</i>	.82	.65
<i>t</i>	2.07	
$p > .05$		

expanded in order to cope with nonrepresentative samples. The psychological resemblance among types on Holland's (1973) hexagonal model is assumed to be inversely proportional to the distance among types. Given that the correlation between the Realistic and Investigative types is .46, and in view of the fact that in the present research only two subjects received a Realistic code, Realistic and Investigative cells were combined—resulting in a minimal loss of data.

RESULTS

SDS Assessment. The distributions of "initial" daydream preferences for subjects completing the standard and revised SDS forms were not significantly different. At the midpoint of the assessment process, the Occupations section, the SDS asks subjects to designate their preference for occupational titles grouped according to Holland's six types. Summary codes were derived for the subjects' Occupations scores. There was no significant difference between the standard and revised forms. Social high point codes were the most frequently occurring—52 percent for the standard form and 58 percent for the revised form.

Among the high point summary codes at the end of the assessment process there was no significant difference between the SDS standard and SDS revised forms. Table 1 displays the frequency distribution of high point codes for both forms of the SDS. This lack of difference in final summary codes of the two forms indicates that the removal of masculine-toned terminology did not result in any appreciable difference in these female subjects' performance including their concentration in the Social area.

Similarly, the distributions of post SDS occupational preferences as assessed by Item (a) of the questionnaire revealed no significant differences.

Nontraditional Occupational Choices. In contrast to earlier analyses that used only the initial daydream, the pool of daydream occupational choices (three per subject) was examined with respect to nontraditional occupational preferences of women. Nontraditional occupations were listed by 36 and 35 percent of the subjects, completing the standard and revised forms, respectively. This finding indicates that subjects on the average had included one nontraditional occupation among their choices prior to the SDS experience.

Did subjects differ in the frequency of nontraditional occupations cited at the point of initial and post SDS assessment? There were no significant differences between forms nor between most recent daydreams and subsequent choices. Nontraditional initial occupational choices were made by 41 and 47 percent of the subjects completing the standard and revised forms. Similarly,

subsequent nontraditional occupational choices were made by 41 and 48 percent of the subjects completing the standard and revised forms.

Did subjects differ in the total number of nontraditional occupations selected from the Finder booklets on the basis of their final summary code of permutations thereof? Again there was no significant difference found between the pool of occupations listed by subjects completing the standard and the revised forms. Table 2 displays the means and standard deviations for the pool of listed occupations. For this analysis 12 percent of the standard and 14 percent of the revised assessment booklets were dropped due to unlisted summary codes or errors in final summary codes.

Subjects on the average selected 11 occupations from their Finder booklets. Of the 1479 occupations listed by the standard SDS group, 567 (38 percent), were nontraditional occupations for women. In the revised SDS group, 545 (41 percent), of the 1317 listed occupations were so classified. This finding indicates that subjects on the average included three nontraditional occupations among their choices during the final stage of SDS assessment.

Perceived Sexual Equality. Subjects evaluated the SDS form which they had just completed with respect to its perceived sexual equality. The item read as follows:

Please make an X on the line that corresponds to your feeling about the question below:

"This inventory was equitable on both male and female occupational interests."

Scale points and values were: "Strongly Agree" (1), "Agree" (2), "Neutral" (3), "Disagree" (4), and "Strongly Disagree" (5). A significant difference was found in perceived sexual equality of the standard and revised SDS forms, $t_{\infty} = 2.07$, $p < .05$. In terms of agreement ("Strongly Agree" and "Agree"), 85 percent of the standard group and 89 percent of the revised group expressed this attitude. At the other extreme ("Strongly Disagree" and "Disagree"), 6 percent of the subjects completing the standard form and less than 1 percent of the subjects completing the revised form expressed this view.

DISCUSSION

The results strongly imply that the revision of occupational titles and test-taking instructions in interest inventories to reduce sex role stereotyping has no significant effect on the assessment codes or on the vocational aspirations of college women. This interpretation is strengthened by two related experiments which also obtained negative results (Gottfredson, *Measurement and*

Evaluation in Guidance, in press; Holland and Gottfredson, *Measurement and Evaluation in Guidance*, in press), for samples of high school students and young adults.

Subjects in the present research should be followed up to determine the degree to which they have engaged in the final section of Holland's SDS experience entitled "Next Steps." Once formal assessment has been completed, subjects are encouraged to explore the occupations derived from their summary codes or permutations thereof. Typically such exploration is conducted through the reading of vocational literature, conferring with persons currently employed, work/study experiences, and reconsideration of their own self-assessments in light of their accumulated experiences. Whether subjects during the recommended exploration phase of the SDS ("Next Steps") attend differentially to the nontraditional and traditional occupations which they selected remains an empirical question. The question of differential attention to occupational selections is also suggestive of experimental interventions designed to increase attention to nontraditional choices. Studies exploring interventions that increase the adult female's nontraditional occupational choice repertoire have special merit, quite apart from interventions aimed at influencing the expansion of the female's occupational options at a much earlier chronological age.

Future investigators of sex-bias might well direct their energies toward other aspects of vocational exploration in light of the results of the present research—results which imply that the occupational stereotypes of at least young adult women are powerful conceptions that are relatively immune to superficial spelling changes or to rational appeals such as "Women can succeed in all occupations." Consequently, more long-term and potent treatments appear necessary to free women from current sex role stereotyping.

REFERENCES

- Almquist, E.M. and Angrist, S.S. "Career Salience and Atypicality of Occupational Choice Among College Women." *Journal of Marriage and the Family*, 32 (1970): 2, 242-249.
- Birk, J. "Reducing Sex Bias-Factors Affecting the Client's View of the Use of Career Interest Inventories." Paper presented at the National Institute of Education, March, 1974.
- Broverman, I.D., Vogel, S.R., Broverman, D.M., Clarkson, F.E. and Rosenkrantz, P.S. "Sex-role Stereotypes: A Current Appraisal." *Journal of Social Issues* 28(2) (1972): 59-78.
- Christensen, K.C., Gelsco, C.J., Williams, R.C. and Sedlacek, W.E. "Variations in the Administration of the Self-Directed Search, Scoring Accuracy and Satisfaction with Results." *Journal of Counseling Psychology* 22 (1975): 12-17.
- Davies, K.F. "A Comparative and Normative Study of Holland's Self-Directed Search Modified for Elementary School Students." Unpublished master's thesis, University of Maryland, College Park, 1971.
- Economic Report of the President*, Washington: 1973.
- Gottfredson, G.D. "A Note on Sexist Wording in Interest Measurement." *Measurement and Evaluation in Guidance* 5 (1975): 496-501.
- Harmon, L.W. "Sexual Bias in Interest Measurement." *Measurement and Evaluation in Guidance* 5 (1973): 495-501.
- Holland, J.L. *The Self-Directed Search*. Palo Alto, California: Consulting Psychologists Press, 1970.
- Holland, J.L. "A Theory-Ridden Computerless, Impersonal Vocational Guidance System." *Journal of Vocational Behavior* 1 (1971): 167-176.
- Holland, J.L. *Making Vocational Choices*. Englewood Cliffs, New Jersey: Prentice-Hall, 1973.
- Holland, J.L. "The Use and Evaluation of Interest Inventories and Simulations." Paper presented at the National Institute of Education, March, 1974.
- Holland, J.L. and Gottfredson, G.D. "Sex Differences, Item Revisions, Validity and the Self-Directed Search." *Measurement and Evaluation in Guidance*, in press.
- Huth, C.M. "Measuring Women's Interests: How useful?" *Personal and Guidance Journal*, 51 (1973): 539-545.
- Pietrofesa, J. and Schlossberg, N.K. "Counselor Bias and the Female Occupational Role." Detroit: College of Education, Wayne State University, 1970. ERIC Abstract CG 006 056.
- Schlossberg, N.K. and Goodman, J. "Imperative for Change: Counselor Use of the Strong Vocational Interest Blank." *Impact* 2 (1972): 25-29.
- Statistical Reporter. Office of Management and Budget, 74, No. 4, October, 1973, Washington, D.C.: U.S. Government Printing Office.
- Tanney, M.F. "Face Validity of Interest Measures: Sex-Role Stereotyping." Paper presented at the National Institute of Education, March, 1974.
- Thomas, A.H. and Stewart, N.R. "Counselor Response to Female Clients with Deviate and Conforming Career Goals." *Journal of Counseling Psychology* 18 (1971): 352-357.
- Tittle, C.K. *Women and Educational Testing: A Selective Review of the Research Literature and Testing Practices*. New York: Office of Teacher Education, City University of New York, 1973.
- U.S. Department of Commerce, Bureau of the Census, *United States Census of the Population: Occupations by Industry*, Report PC(2) - 7c, 1960.

Sex and the Single Interest Inventory: The Empirical Validation of Sex-Balanced Interest Inventory Items*

By

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Abstract. Previous studies of sex bias in interest measurement have suggested that item sex bias is a necessary concomitant of inventory validity. This study provides empirical evidence in support of the hypothesis that it is possible to construct a valid interest inventory consisting primarily of items that have been pretested for sex balance. Potentially sex-balanced items were developed and pretested. Items from the pretest that were sex-balanced and that showed "good" item characteristics were included on the sex-balanced Unisex Interest Inventory (Uni-

II). Both the Uni-II and the American College Testing Interest Inventory (ACT-IV) were administered to a national sample of 1,902 students. Comparisons were made between the two inventories on item and scale sex balance. The items on the Uni-II were found to be more sex-balanced than those on the ACT-IV. Similarly, the Uni-II exhibited superior scale sex balance. Same-scale item homogeneity, cofactorial analysis, and spatial configural analysis supported the concurrent and construct validity of the Uni-II.

Since the development of interest inventories, considerable research has been generated regarding their use in guidance and counseling. Until the late 1960s, the nature of this research had been surprisingly free of controversy. In the last several years, however, controversy has been the rule rather than the exception, as both minority groups and women's rights groups have begun to voice increased concern about the social impact of interest measurement. Cole and Hanson (Note 1) described this concern as it relates to women:

Because of the power that derives from a person's occupation in this society, both through money and status, one focal area of the women's movement has been the career opportunities of women. One specific concern in this area is the effect that interest inventories have on women's career choices and, in particular, the possibility of a negative, limiting effect. (p. 1)

Similar concerns led to the writing of the "Association for Measurement and Evaluation in Guidance Commission Report on Sex Bias in Interest Measurement" (AMEG Commission on Sex Bias in Measurement, 1973), the holding of the National Institute of Education (NIE) Workshop on Sex Bias and Sex Fairness in Career Interest Inventories, and a flurry of journal articles dealing with similar topics (Harmon, 1973; Huth, 1973; Johansson and Harmon, 1972; Schlossberg and Goodman, 1972).

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The thrust of the research thus far has been concerned with the sexual bias that results from the use of unneutered words, separate sex scales, and separate sex norm groups. The most basic component of the interest inventory, however, the individual item, has received little attention. In a paper submitted to the NIE Workshop in Sex Bias and Sex Fairness in Career Interest Inventories, Harmon (Note 2) acknowledged the importance of establishing whether or not scales using sex-balanced items are technically feasible. Meanwhile, however, the literature is conspicuously lacking in research relevant to individual item sex bias, and most researchers have apparently assumed that items with large response differences between sexes make important contributions to the inventory scales (Campbell, 1974; Holland, Note 4).

The purpose of this study was to determine whether or not sex-balanced items could be written and whether an inventory constructed of these items would measure interests.

METHOD

Procedure

The first step was to identify sex "balanced" and "unbalanced" items on an existing interest measure. To this end, rather extensive item analyses were performed on the American College Testing Interest Inventory (ACT-IV; Rayman, 1974). The ACT-IV consists of 90 short items, 15 of which load on each of the six scales (Technologies and Trades; Natural, Social, and Medical Sciences; Creative and Applied Art; Social, Health, and Personal Services; Business Sales and Management; Business Operations). These six scales are based on the theor-

etical formulations of Holland (1966) and correspond to the six interest dimensions that he has identified (Realistic, Investigative, Artistic, Social, Enterprising, Conventional). For simplicity's sake, the Holland scale names are used throughout this article. Data used for the analysis of item sex balance on the ACT-IV were obtained from the records of 3,439 college-bound students who made up the ACT-IV normative sample (American College Testing Program, Note 5).

Items were classified as sex "balanced" or "unbalanced" on the basis of Item X Sex cross-tabulations. For the purposes of this study, the five Likert-type item options (like very much, like, indifferent, dislike, dislike very much) were collapsed into three categories as follows: like very much and like were scored as "like", indifferent was scored as "indifferent" and dislike and dislike very much were scored as "dislike." Items exhibiting 10 percent or less difference in "like" responses between sexes were classified as "balanced"; others were considered to be "unbalanced." The results of this item analysis, together with Holland's (1973) descriptions of the six interest dimensions, provided guidelines for the generation of prospective new sex-balanced items.

Based on these guidelines, prospective sex-balanced items were written and assigned to each of the six Holland scales. These items were pretested on a sample of 220 Rock Island, Illinois, college-bound high school seniors. The sex-balanced items from the pretest with the most favorable "item characteristics" were selected for inclusion on the Unisex Interest Inventory (Uni-II).

Next, both the ACT-IV (90 items—15 per scale) and the Uni-II (74 items—12 per scale, 14 per scale for Social) were combined into a single inventory called the Combined Form Experimental Interest Inventory, which was administered by mail to a national sample of 3,000 college-bound students.

Finally, the data gathered from this national administration were analyzed in several ways. The use of the combined form allowed a comparative analysis that provided a highly effective means of demonstrating the relative item sex balance of the ACT-IV and the Uni-II.

Sample

The 164-item Combined Form Experimental Interest Inventory, consisting of the ACT-IV and the Uni-II, was administered by mail to a sample of 3,000 college-bound students. The sample was obtained by taking every 132nd individual from approximately 400,000 students who registered to take the American College Testing Assessment on the October and December 1973 national test dates. Approximately 92 percent of the students in the original pool were high school seniors. A 66.3 percent response rate was achieved through the use of two

follow-ups. Of the returned inventories, 1,902 (95 percent) were usable.

Analysis

First, Item X Sex cross-tabulations were calculated to determine the sex "balance" for all of the items on each of the six scales of both inventories.

Second, the relative scale sex balance of the two inventories were compared by (a) calculating the average difference between men and women in the percentage of "like" responses for each of the six scales of the Uni-II and the ACT-IV and (b) by calculating raw score scale means for the ACT-IV and the Uni-II across all subjects by sex. It was hypothesized that (a) the average difference between men and women in the percentage of "like" responses would be lower for the Uni-II scales than for the ACT-IV scales and (b) that the raw score scale mean difference between men and women on the Uni-II would be lower than the corresponding raw score scale mean difference between men and women on the ACT-IV.

Third, item/scale total correlations were computed in three different ways: (a) ACT-IV item/scale total correlations were calculated, (b) Uni-II item/scale total correlations were calculated, and (c) Uni-II item/ACT-IV scale total correlations were calculated. It was hypothesized that (a) the Uni-II item/scale total correlations would be quite similar to those of the ACT-IV, thus indicating that Uni-II items load as well on their respective scales as do ACT-IV items and (b) would be quite high, thus offering evidence that the Uni-II items measure the same interest dimensions as the ACT-IV items (concurrent validity).

Fourth, the Uni-II was compared with the ACT-IV on the similarity of the scale intercorrelation matrix of the six Holland scales. The similarity of the scale intercorrelation matrices was determined by the "analysis of spatial configuration" developed by Cole and Cole (Note 6). It was hypothesized that spatial configural analysis of the Uni-II scale intercorrelation matrix would yield the expected circular patterning of scale points, with all scale points falling in the same order as they do for the ACT-IV (viz., Realistic, Investigative, Artistic, Social, Enterprising, Conventional, in clockwise order). Such a finding would support the construct validity of the Uni-II scales.

Finally, as further evidence of the concurrent and construct validity of the Uni-II scales, correlations were computed between the total scale scores of the ACT-IV and those of the Uni-II. If the two instruments are measuring the same interest dimensions, high correlations between like-named scales should be obtained.

RESULTS

Results of the Item X Sex cross-tabulations for all of the items on the Uni-II and the ACT-IV are summarized in Table 1. Of the 74 items on the Uni-II, 49 (66 percent) have a difference in "like" responses between sexes of 10 percent or less, and 67 items (91 percent) have a difference in "like" responses between sexes of 15 percent or less. This contrasts sharply with the corresponding statistics for the ACT-IV, which has only 36 items (40 percent) with a difference in "like" responses between sexes of 10 percent or less, and 45 items (50 percent) with a difference in "like" responses between sexes of 15 percent or less.

Summary data regarding scale sex balance for both the Uni-II and the ACT-IV are also presented in Table 1. Several important characteristics of the Uni-II are evident from these summary data. First, the average difference between men and women in the percentage of "like" responses is much smaller for the Uni-II than for the ACT-IV on all six scales. Scales showing marked improvement in sex balance by this measure were the Realistic, Investigative, Artistic, and Social scales. These small "average differences" indicate that the scale sex balance of the Uni-II is considerably better than that of the ACT-IV.

Second, the data presented indicate that the range of response differences by scale significantly decreased on the Uni-II. These data show that although both the ACT-IV and the Uni-II have some very "balanced" items on all scales, the ACT-IV has some items on all six scales that elicit very large response differences by sex. On every scale, this range of response difference was cut by approximately half on the Uni-II.

Third, Table 1 indicates that larger percentages of items on the Uni-II than on the ACT-IV exhibit a difference in the percentage of "like" response of 10 percent or less on the four ACT-IV scales that are most difficult to balance: Realistic, Investigative, Artistic, and Social. Fully 66 percent of the items on the Uni-II are sex-balanced within 10 percent, while only 40 percent of the ACT-IV items are as balanced.

Finally, the last two sections of Table 1 indicate whether the "unbalanced" items that appear on the two inventories are unbalanced in favor of men or women. The Uni-II shows considerable improvement over the ACT-IV in this respect also. Particularly notable here is the Realistic scale. Although six of the items (or 50 percent on the Realistic scale of the Uni-II are "unbalanced," overall scale balance is maintained because three of these items (or 25 percent) are "unbalanced" in favor of men and three (or 25 percent) are "unbalanced" in favor of women. In contrast, 12 of the 15 items on the Realistic scale of the ACT-IV are "unbalanced" in favor

of men, while none are "unbalanced" in favor of women.

The Social scale of the Uni-II, while exhibiting considerable improvement over the Social scale of the ACT-IV, continues to be the least balanced of the six scales. Eight items (57 percent) on the Social scale were "unbalanced" in favor of women, while none favored men. This does not necessarily indicate that it is impossible to write sex-balanced social items, since six of the items (or 43 percent) on the Social scale of the Uni-II were "balanced." What it suggests is that more effort is needed to develop sex-balanced social items.

The comparison between the raw score scale means for men and women on a given scale of an interest inventory is perhaps the most important single indicator of scale sex balance. Comparisons of the raw score scale means for men and women on the Uni-II and the ACT-IV, respectively, are presented in Table 2. One-sample, two-tailed *t* tests were used to determine whether the means for women were significantly different from those of men.

No statistically significant difference was found between the scale means for men and women on the Realistic, Artistic, and Conventional scales of the Uni-II. The difference between the means on the Enterprising scale was significant at the .05 level. The difference on the Investigative scale was significant at the .01 level, and the difference on the Social scale was significant at the .001 level. The difference between the means on the Realistic, Investigative, Artistic, and Social scales of the ACT-IV were all significant at the .001 level. No statistically significant difference was found between the scale means for men and women on the Enterprising and Conventional scales of the ACT-IV.

Although statistically significant, the relatively small differences between the scale means for men and women on the Investigative and Enterprising scales of the Uni-II probably have limited practical significance.

The most important finding presented in Table 2 is that the raw score scale means for men and women on the Uni-II are surprisingly similar. Even the Social scale means are markedly more similar on the Uni-II than on the ACT-IV. This characteristic of the Uni-II has tremendous psychometric implications that will be discussed later in this article.

Item-total correlational analysis yielded several important findings. For all scales on both the Uni-II and the ACT-IV, the median item-total correlation of the scale item set with its scale total score was found to be considerably higher than with any other scale total score. These same scale values ranged from an *r* of .55 to .78. Thus, the scales of both inventories are relatively homogeneous, indicating that the items for each scale

TABLE 1
Sex Differences on Uni-II^a and ACT-IV^b
Item Responses for a Sample of 1,902 College-Bound Students^c

	Inventory scales						Percentage of total
	Realistic	Investigative	Artistic	Social	Enterprising	Conventional	
Average difference ^d between men and women in the percentage of "like" responses	8.86 (24.97)	4.53 (14.23)	5.83 (15.01)	10.61 (26.81)	6.2 (8.61)	7.83 (11.03)	
Range of response differences	1.1-15.9 (.7-41.8)	.4-15.7 (1.1-36.8)	.5-24.3 (1.5-49.2)	.2-24.7 (9.7-57.4)	.1-15.3 (0-35.2)	2.0-13.3 (.5-36.8)	
The percentage of items showing a difference in the percentage of "like" responses of 10% or less	50 (20)	92 (33)	83 (47)	43 (7)	83 (80)	50 (53)	66 (40)
The percentage of items with men having a 10% or higher percentage of "like" responses	25 (80)	8 (53)	0 (0)	0 (0)	8 (0)	8 (13)	8 (24.4)
The percentage of items with women having a 10% higher percentage of "like" responses	25 (0)	0 (13)	17 (53)	57 (93)	8 (20)	42 (33)	26 (35.6)

^a Uni-II = Unisex Interest Inventory. Values are those *not* shown in parentheses.

^b ACT-IV = American College Testing Interest Inventory. Values are shown in parenthesis.

^c Sample based on 1,173 women and 729 men completing the six 15-item scales of the ACT-IV and the six 12-item scales of the Uni-II.

^d Average difference = mean of the absolute difference between the percentage of "like" responses for men and the percentage of "like" responses for women.

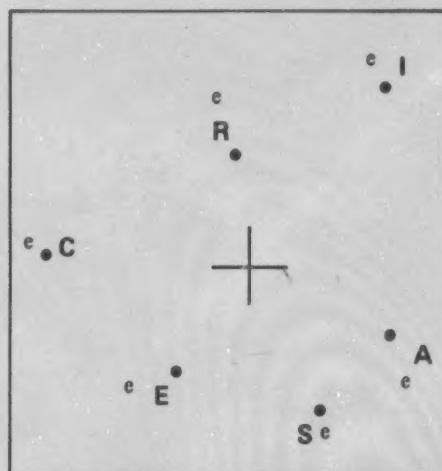


FIG. 1. Spatial configuration of scales for the Unisex Interest Inventory (filled circles) and the American College Testing Interest Inventory (open circles).

TABLE 2

Raw Score Scale Means of the Uni-II^a and the ACT-IV^b by Sex

Scale	Men (n = 729)		Women (n = 1,173)		t
	M	SD	M	SD	
Realistic	3.14 (3.19)	.68 (.67)	3.09 (2.50)	.69 (.66)	1.814 (21.843)***
Investigative	3.14 (3.20)	.89 (.88)	2.99 (2.81)	.93 (.91)	3.335** (9.375)***
Artistic	3.18 (2.91)	.83 (.77)	3.21 (3.29)	.83 (.76)	-.763 (-10.599)***
Social	3.71 (3.37)	.55 (.67)	4.00 (4.01)	.51 (.61)	-11.642*** (-20.897)***
Enterprising	3.07 (3.02)	.61 (.70)	3.00 (3.08)	.61 (.67)	2.261* (-1.769)
Conventional	2.77 (2.82)	.67 (.74)	2.74 (2.86)	.71 (.80)	1.047 (-1.105)

^aUni-II = Unisex Interest Inventory. Values are those *not* shown in parentheses.^bACT-IV = American College Testing Interest Inventory. Values are shown in parentheses.* $p < .05$.** $p < .01$.*** $p < .001$.

TABLE 3

Scale Intercorrelations of the ACT-IV^a and the Uni-II^b for Combined Sexes

Scale	R ₁	I ₁	A ₁	S ₁	E ₁	C ₁	R ₂	I ₂	A ₂	S ₂	E ₂	C ₂
R ₁	1.00											
I ₁	.46	1.00										
A ₁	.07	.15	1.00									
S ₁	-.12	-.01	.43	1.00								
E ₁	.19	-.08	.31	.38	1.00							
C ₁	.28	.06	.01	.07	.49	1.00						
R ₂	.66	.27	.27	.17	.18	.22	1.00					
I ₂	.41	.86	.22	.14	.01	.06	.32	1.00				
A ₂	.19	.17	.80	.29	.31	-.01	.29	.24	1.00			
S ₂	.01	.11	.47	.75	.48	.14	.21	.26	.43	1.00		
E ₂	.25	.05	.36	.42	.72	.38	.28	.15	.43	.60	1.00	
C ₂	.40	.03	.06	.16	.56	.75	.42	.09	.11	.25	.57	1.00

^aACT-IV = American College Testing Interest Inventory.^bUni-II = Unisex Interest Inventory.

NOTE: R = Realistic, I = Investigative, A = Artistic, S = Social, E = Enterprising, C = Conventional. A subscript of one indicates ACT-IV scales; a subscript of two indicates Uni-II scales. Underlined values indicate Uni-II/ACT-IV same-scale correlations.

are measuring the construct they were designed to measure.

Median item-total correlations for the Uni-II item sets with their respective ACT-IV scale total score ranged from .40 to .65. These relatively high correlations provide strong support for the concurrent validity of the Uni-II scales.

The intercorrelation matrix for the Uni-II and the ACT-IV for combined sexes is shown in Table 3. Interpretation of this large 12 X 12 matrix is simplified by means of the spatial configuration of scale plots in Figure 1. The correlation values from Table 3 may be used to supplement the figure.

The extent to which the intercorrelation matrix can be represented by its spatial configural plot in two dimensions is indicated as the percentage of trace for the first two components of the second-stage analysis (Cole and Cole, Note 6, p. 3). This value can be interpreted as the percentage of the variance of the scale points in *n*-dimensional multivariate space accounted for by the two dimensions plotted. If a high percentage of trace is found, the relationships among the variables can be adequately represented in two-dimensional space. For the 12 X 12 intercorrelation matrix of the Uni-II and ACT-IV scales, this value is 54.6 percent and is comparable to values reported in previous research using the same analysis (Cole and Hanson, 1971). Thus, the two-dimensional plots in Figure 1 provide a reasonable visualization of the 12 X 12 intercorrelation matrix of the Uni-II and the ACT-IV scales.

The 6 X 6 intercorrelation matrix of the Uni-II scales are also subjected to spatial configural analysis. The actual plots are not presented here, but they were substantially the same as the Uni-II plots presented in Figure 1. The percentage of variance accounted for by the two dimensions plotted for the Uni-II was 60.1 percent. The configuration for the Uni-II clearly follows the expected circular configuration of scale points representing the Holland format, with all scale points falling in the correct order. A comparison of these plots for the Uni-II and the ACT-IV with their respective intercorrelation values in Table 3 verifies that the spatial configuration does accurately depict the intercorrelation values. The scale points adjacent to each other in the plots (e.g., R_1 , I_1 , or S_2 , A_2) have the highest intercorrelations (.46 and .43 in the two examples cited), and the scale points most distant from each other in the plots (e.g., S_1 , I_1 , or E_2 , I_2) have the lowest intercorrelations (-0.01 and .15 in the two examples cited).

Another important finding presented in Table 3 is the strong correlation that exists between the same scales of the Uni-II and the ACT-IV. These values have been underlined in Table 3, and it is important to note that the lowest of these six interscale correlations is .66.

These strong intercorrelations can also be visualized in Figure 1, where all Uni-II scale plots fall in close proximity to their respective ACT-IV scale plots.

The close similarity between the spatial configurations (and intercorrelation matrices) of the Uni-II and the ACT-IV is strong evidence in support of the concurrent and construct validity of the Uni-II. The high correlations between the Uni-II scales and their respective ACT-IV scales are evidence for concurrent validity. Construct validity is supported by the fact that the spatial configuration of Uni-II scales conforms with the circular structuring of interests as supported by considerable research (Holland, 1973).

CONCLUSIONS

The results of this study suggest that it is possible to construct an interest inventory consisting primarily of sex-balanced items. As indicated, 49 of the 74 items (66 percent) on the Uni-II are sex-balanced within 10 percent. Although 49 sex-balanced items are not enough to construct a valid interest inventory, other sex-balanced items are known to exist. For example, 33 of the 90 items on the ACT-IV are also sex-balanced. In addition, Johansson and Harmon (1972) have reported that 50-60 percent of the items on the Strong Vocational Interest Blank are relatively sex-balanced. Such findings leave little doubt that a totally sex-balanced interest inventory could be constructed by pooling the sex-balanced items from these three sources.

Second, sex-balanced items *can* and *do* measure interest. The sex-balanced items on the Uni-II display item characteristics comparable to those items on the ACT-IV. Median item-total correlations for the Uni-II scales indicate that same-scale items are relatively homogeneous and that the degree of homogeneity is similar to that exhibited by the ACT-IV scales.

In addition, considerable data provide supporting evidence of the construct validity of the Uni-II scales. First, the homogeneity of same-scale items described above may be interpreted as evidence supporting the construct validity. Considerable research evidence supports the circular structure of interests (Holland, 1973). The items on the scales of the Uni-II are homogeneous and measure the six Holland-type interest dimensions well, thus providing preliminary evidence of the construct validity of the Uni-II.

Also supportive of construct validity is the fact that the intercorrelation matrix of the Uni-II, as represented by its spatial configuration, conforms closely to the circular structure of interests proposed by Holland (1966, 1973). The preponderance of evidence from this study supports the conclusion that sex-balanced items can and do measure interests and that it is possible to construct a

valid interest inventory consisting primarily of sex-balanced items.

All of the research in this study was done on the Uni-II and the ACT-IV, both of which utilize internal criteria. Whether or not sex-balanced items could be developed that would discriminate between occupational groups and person-in-general groups (external criteria), as in the case of the Strong-Campbell Interest Inventory (SCII), is not known.

Nevertheless, there are many similarities between the ACT-IV and other inventories suggesting that findings from this study may be applicable to other inventories. The item content in the ACT-IV is similar to that of other inventories. Items include preferences for occupations, school subjects, work tasks, and avocational activities. Given this similarity of item content, it seems likely that sex-balanced items could be developed for inventories utilizing external criteria. A major obstacle to the development of sex-balanced items for use with inventories using external criteria is the existence of sex role stereotypes that frequently influence occupational group membership. Inventories using internal criteria can avoid reference to occupations that have come to be associated with one sex or the other, but this is not as easy when external criteria are used. Therefore, the task of developing sex-balanced items for use with inventories using external criteria will probably be much more difficult. During the current period of changing work values, sex bias can probably be most easily avoided by using inventories that rely on internal criteria.

The successful construction of an interest inventory consisting primarily of sex-balanced items could have tremendous implications for norming, scoring, and score reporting. If an inventory has completely sex-balanced items, there will be no need for separate norm groups by sex as in the case of the SCII. Complicated separate-sex scoring techniques (as in the case of the ACT-IV) could be eliminated, and standard scores could be reported on a totally neuter form with no reference whatsoever to sex. The use of standard scores based on a norm group sample of half men and half women would allow an individual to validly compare the relative strength of his or her interests across scales. This would greatly streamline the process of scoring, yet score reports would be sex-fair, and the sex bias that has been attributed to separate-sex reporting procedures would be eliminated.

An inventory constructed solely of sex-balanced items would logically seem to exhibit somewhat lower predictive validity, but would be much more sex-fair than existing instruments. While predictive validity may be lowered, many feel it is equally important that interest inventories stimulate career exploration and help users to think about alternative career options. Certainly one of the goals of interest measurement must be to give

people, regardless of sex, the opportunity to consider a range of career options. That interest inventories have been sex-restrictive in the past has led to the questioning of their value today (Prediger and Hanson, 1974). Preliminary results of research now being done (Hanson and Rayman, Note 7) suggest that sex balance can be achieved with little or no loss of predictive validity.

For the counselor who is concerned about sex bias in interest measurement, the development of an inventory consisting solely of sex-balanced items would be welcome news. Many of the concerns associated with interest testing about "channeling" on the basis of sex could be put to rest. A unisex inventory would provide such a counselor with a useful tool for the exploration and measurement of a client's interests and would eliminate many of the qualms he or she may have about the inherent sexual bias of such instruments.

The development of an inventory consisting solely of sex-balanced items would also have implications for the counselor who is not concerned about sex bias in interest measurement. Although such a counselor may not be disposed to use a unisex instrument, the instrument could be used with clients who are particularly sensitive about sex role stereotyping.

The eventual commercial development of an interest inventory consisting solely of sex-balanced items would insure that future groups of men and women will be treated in a sexually unbiased way with respect to the measurement of their interests. Such an inventory would virtually eliminate the "channeling" of women into traditionally feminine occupations (or men into traditionally masculine occupations) on the basis of inventory scores.

REFERENCE NOTES

1. Cole, N. S. and Hanson, G. R., "Impact of Interest Inventories on Career Choice." Paper presented at the National Institute of Education Workshop on Sex Bias and Sex Fairness in Career Interest Inventories, Washington, March 1974.
2. Harmon, L. W., "Technical Aspects: Problems of Scale Development, Norms, Item Differences by Sex and the Rate of Change in Occupational Group Characteristics." Paper presented at the National Institute of Education Workshop on Sex Bias and Sex Fairness in Career Interest Inventories, Washington, March 1974.
3. Cole, N. S., "Unresolved Technical Issues in Fair Interest Measurement." Paper presented at the annual meeting of the American Personnel and Guidance Association, New Orleans, April 1974.
4. Holland, J. L., "The Use and Evaluation of Interest Inventories and Simulations." Paper presented at the National Institute of Education Workshop on Sex Bias and Sex Fairness in Career Interest Inventories, Washington, March 1974.

5. American College Testing Program. *How to Use the ACT Interest Inventory*. Iowa City: Author, 1974.
6. Cole, N. S. and Cole, J. L. *An Analysis of Spatial Configuration and Its Application to Research in Higher Education* (ACT Research Report 35). Iowa City: American College Testing Program, 1970.
7. Hanson, G. R. and Rayman, J. R., "Validity of Sex-Balanced Interest Inventory Scales." Unpublished manuscript, 1975. (Available from J. R. Rayman, Project Discover, Western Maryland College, Westminster, Maryland 21157).

REFERENCES

- AMEG Commission on Sex Bias in Measurement. AMEG commission report on sex bias in interest measurement. *Measurement and Evaluation in Guidance*, 6(1973): 171-177.
- Campbell, D. P. *Manual for the Strong-Campbell Interest Inventory*. Stanford: Stanford University Press, 1974.
- Cole, N. S. and Hanson, G. R. "An Analysis of the Structure of Vocational Interests." *Journal of Counseling Psychology*, 18(1971): 478-486.
- Harmon, L. W. "Sexual Bias in Interest Measurement." *Measurement and Evaluation in Guidance*, 4(1973): 496-501.
- Holland, J. L. *The Psychology of Vocational Choice*. Waltham, Mass.: Ginn, 1966.
- Holland, J. L. *Making Vocational Choices: A Theory of Careers*. Englewood Cliffs, N.J.: Prentice-Hall, 1973.
- Huth, C. M. "Measuring Women's Interests: How Useful?" *Personnel and Guidance Journal*, 51(1973): 539-545.
- Johansson, C. B. and Harmon, L. W. "The Strong Vocational Interest Blank: One Form or Two?" *Journal of Counseling Psychology*, 19(1972): 404-410.
- Prediger, D. J. and Hanson, G. R. "The Distinction Between Sex Restrictiveness and Sex Bias in Interest Inventories." *Measurement and Evaluation in Guidance*, 7(1974): 96-104.
- Rayman, J. R. *Sex and the Single Interest Inventory: An Empirical Validation of Sex-Balanced Vocational Interest Inventory Items*. Unpublished doctoral dissertation, University of Iowa, 1974.
- Schlossberg, N. K. and Goodman, J. "Imperative for Change: Counselor Use of the Strong Vocational Interest Blanks." *Impact*, 2(1972): 25-29.

Validity of Sex-Balanced Interest Inventory Scales*

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Abstract. The purpose of this study was to examine the relative effectiveness of sex-balanced and sex-restrictive raw score interest scales in discriminating among vocational preference groups. Analyses were conducted separately for 502 males in six vocational preference groups and 878 females in five vocational preference groups. The degree and nature of the discrimination among groups were highly similar for the two types of scales for both males and females. Centour scores derived from

sex-balanced and sex-restrictive raw scores resulted in essentially the same percentages of correct classifications of group membership. The results of this study suggest that the large sex differences traditionally found in interest inventory items may not be a necessary concomitant of validity. Hence, interest inventory reports that reflect these differences may unnecessarily restrict the career suggestions they provide to women and men.

Sex bias in interest inventories has received considerable attention the last few years (Cole and Hanson, Note 1; Diamond, 1975; Harmon, 1973; Holland, 1974; Huth, 1973; Johannson and Harmon, 1972; Schlossberg and Goodman, 1972). Much of this concern has centered on the social impact of interest measurement. Cole and Hanson (Note 1) describe this concern as it relates to women as follows:

Because of the power that derives from a person's occupation in this society, both through money and status, one focal area of the women's movement has been the career opportunities of women. One specific concern in this area is the effect that interest inventories have on women's career choices and, in particular, the possibility of a negative, limiting effect (p. 1).

Interest inventory results, when reported as raw scores, tend to suggest a restricted range of career options to men and women. A larger proportion of men than women obtain high career interest scores in the science, technical, and business contact areas; while more women than men obtain high career interest scores in social service, creative arts, and business detail interest areas (Gottfredson, Holland and Gottfredson, 1975). Prediger and Hanson (1974) operationally define interest inventory results which suggest disproportionate career options to men and women as sex-restrictive. Typically, the suggested career options are traditional for a person's sex. This operational definition will be used throughout the study.

The primary reason that men and women obtain different raw score interest inventory results is because of large sex differences in the responses to traditional interest inventory items (Campbell, 1974; Johannson and Harmon, 1972). Test developers have apparently assumed that these sex differences contribute to the construct and criterion-related validity of the instrument (e.g., Campbell, 1974, Chap. 3 and 7). Not all interest inventory items show large sex differences, however. At least some proportion, usually about 50 percent of the items are equally attractive to men and women hence are sex-neutral. One wonders how the criterion-related and construct validity of interest scales consisting entirely on sex-neutral items (balanced scales) compares with that of sex-restrictive scales. To date we don't know; insufficient evidence exists to draw conclusions. However, the *NIE Guidelines for Assessment of Sex Bias and Sex Fairness in Career Interest Inventories* (Diamond, 1975) recognized the positive aspects of balanced interest inventory scales and recommended that

Insofar as possible, item pools should reflect experiences and activities equally familiar to both females and males. In instances where this is not currently possible, a minimum requirement is that the number of items generally favored by each sex be balanced. Further, it is desirable that the balance of items favored by each sex be achieved within individual scales, within the limitations imposed by validity considerations (p. xxv).

The rationale supporting this recommendation is that sex-balanced scales, by definition, are not sex-restrictive. That is, an item pool that elicits similar responses from men and women will produce similar proportions of

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career suggestions to women and men and hence the interest inventory scales are sex-balanced. The question remains whether or not sex-balanced scales (a) measure interest constructs, (b) differentiate among educational and occupational criterion groups, and (c) predict career choice and entry as well as sex-restrictive scales. If sex-balanced scales "work" as well as sex-restrictive scales, it would be difficult to defend the use of interest inventory results which suggest restricted career options to women and men.

The general purpose of this study is to examine further the relative criterion-related validity of sex-balanced and sex-restrictive raw score interest inventory scales. More specifically, we hope to answer three important questions: (1) Do sex-balanced raw score scales differentiate among vocational preference groups to the same extent as sex-restrictive raw score scales? (2) Are the interest dimensions which best discriminate among groups the same for both types of scales? (3) How well do the two types of scales classify individuals into the appropriate vocational preference groups?

The authors recognize that vocational preference, while a popular criterion, is not an adequate criterion of occupational satisfaction. As Holland (1973) has indicated, the characteristics of vocational preference groups are similar to those of occupational groups, and vocational preference has frequently been used as a criterion in validation studies. A comparison of the ability of sex-balanced and sex-restrictive scales in differentiating among vocational preference groups should provide at least preliminary evidence of the relative merits of the two approaches to interest inventory development.

METHOD

Instruments

The ACT Interest Inventory (ACT IV) described by Hanson (Note 2), and the Unisex Interest Inventory (UNI-II), described by Rayman (1974), measure six general interest dimensions corresponding to Holland's six personal orientations or types (Holland, 1973). Both inventories ask students to respond to career-related activity items by rating, on a 5-point Likert scale, the degree they would like (or dislike) doing each activity. Previous research (Hanson, Note 2) has shown that the ACT IV items are reasonably well sex-balanced across all scales, but are not sex-balanced within individual scales. In one of the first attempts to develop sex-balanced scales, Rayman (1974) constructed six Holland-type sex-balanced raw score interest inventory scales from items having minimal (10 percent or less) sex differences in the percentages of men and women who responded

"like" to the items. Hence, most of the UNI-II items are sex-balanced across and within individual scales. Also, the UNI-II scales possess desirable item and scale characteristics, e.g., high reliability, appropriate inter-scale relationships, etc. For purposes of discussion, the ACT IV raw score scales will be called sex-restrictive and the UNI-II raw score scales will be called sex-balanced. It is important to note that the ACT-IV raw scores are not reported to students because, as Prediger and Hanson (1974) have shown, these raw scores would, indeed, suggest sex-restrictive distributions of career options for men and women. Instead raw scores are converted to standard scores separately by sex. As a result, ACT IV standard score distributions are not sex-restrictive.

Sample

The ACT IV and the UNI-II were administered in a combined inventory by mail to a sample of 3000 college-bound students obtained by taking every 132nd individual from the approximately 400,000 students who completed the ACT Assessment on either the October or December 1973 national test dates. Usable interest inventory results were obtained from 1902 individuals (63.4 percent return rate). Each student's vocational choice was classified into one of 12 possible categories. Six male and five female vocational preference groups having sample sizes of 50 or more were selected from the total group of 1902.

Analysis

Multiple discriminant analysis, with sex-restrictive and sex-balanced raw score scales as independent variables, was used to determine whether the sex-balanced scales differentiated among the vocational preference groups as effectively as the sex-restrictive scales. The degree and nature of the discrimination were summarized by (1) Wilks' lambda (λ) an index reflecting the ratio of within-group variation to total group variation, (2) the correlations of the scales with the discriminant functions (factor pattern structure), and (3) the percentage of "correct" classifications of group membership based on centour scores (Rulon, Tiedeman, Tatsuoka, and Langmuir, 1967). A correct classification ("exact hit") was tabulated if the actual group membership and the group indicated by the highest centour were the same. "Near hits" were tabulated if the second highest centour was the same as the actual group membership. Since a major guidance use of interest inventories is to suggest career alternatives, it is important that the inventory clearly differentiate among criterion groups so that misassignment of group members will be minimized for each of the groups. As suggested by Prediger (Note

3), the objective is to maximize the unweighted average hit rate for the criterion groups rather than maximize the average hit rate weighted according to criterion group size. Hence, the unweighted hit rates based on the two types of interest inventory scores were obtained and these hit rates contrasted with "chance" hit rates also based on unweighted averages. The appropriateness of the approach to validating common uses of interest inventories is discussed in detail by Prediger (Note 3).

RESULTS

Results of the multiple discriminant analysis for the six male and five female vocational preference groups are summarized for the sex-restrictive and sex-balanced scales in Table 1. For both men and women, the Wilks' λ values for the sex-restrictive and sex-balanced scale analyses are similar and indicate a substantial degree of differentiation. The Wilks' λ 's for the sex-restrictive scales are somewhat lower than for the sex-balanced scales, indicating slightly better differentiation. The differences are of little practical significance, however.

Because the discriminant functions which best differentiate among the vocational preference groups are weighted linear composites of the original six raw scores from each inventory, the nature of these functions could be quite different even though the degree of discrimination is highly similar, as noted earlier. Are the original scale variables which contribute the most to differentiation among the vocational preference groups the same for both instruments? Examination of the correlations of the individual interest inventory scales with the first two discriminant functions, which account for more than 80 percent of the discriminating power of the scales for males (90 percent for females), provides an indication of the relative contribution of each scale to the discrimination among groups (Huberty, 1975). The remaining discriminant functions accounted for very little discriminating power of the scales and did not discriminate among the criterion groups in a manner that made intuitive sense.

The pattern of correlations between the interest inventory scales and the first two discriminant functions are highly similar for the two instruments for both men and women. The first discriminant functions account for a majority (more than 60 percent of the total variation among groups for both men and women for both sets of scales and are best described in terms of a bipolar Science-Business interest factor. The second discriminant factors are clearly less dominant and account for approximately 20 to 25 percent of the variation among groups. For men, the second discriminant function, described in terms of high negative correlations with the Technical scales from the two instruments, are also

highly similar. The second discriminant functions for women are similar in nature for the two types of scales, except for the substantial correlation (.50) of the sex-restrictive Science raw score scale with that function, a level of correlation not found for the sex-balanced Science scale. Overall, the nature of the underlying discriminant factors associated with differences among vocational preference groups is surprisingly similar, as individually defined by the two sets of interest inventory scales.

Perhaps the best way to compare the ability of the sex-restrictive and sex-balanced raw score scales to differentiate among vocational preference groups is to examine the percentage of correct classification of group membership using the results of the discriminant analyses just described. The percentages of correct classifications for the six male vocational preference groups are presented in Table 2. In general, the percentage of exact hits based on centour scores derived from the sex-balanced scales was about the same as the percentage based on centour scores derived from the sex-restrictive scales for four of the six groups. The resultant average percentage of correct classifications (exact hits) across all groups was essentially the same for both interest inventories and well above the classification hit rate based on random assignment (17 percent). When the percentage of correct classifications was based on both exact and near hits, nearly two of every three male students were correctly classified. Again, the pattern of correct classifications differed slightly from one instrument to the other but overall comparable levels of accuracy of classification were obtained.

The percentages of correct classifications for the five female vocational preference groups are presented in Table 3. The percentages of exact hits for the two types of scales are nearly identical and much greater than expected on the basis of random assignment (20 percent) for three of the five programs. Highly similar results were obtained from centours based on both sets of scales when exact hits and near hits were used to calculate the percentage of correct classifications. Across the five groups, approximately 60 percent of the women obtained either their highest or second highest centour score for the program in which they were enrolled. Thus the data for both men and women suggest that centour scores based on sex-balanced raw score scales and sex-restrictive raw score scales produce essentially the same accuracy of classification.

So far we have shown that the sex-balanced scales differentiate among male vocational preference groups about as well as the sex-restrictive scales. Similar results were obtained for women. However, it is also important that the individual scale distributions be compared for men and women. As shown previously by Gottfredson

TABLE 1
Contributions of Sex-Restrictive and Sex-Balanced Interest Inventory Scales to the Differentiation of Six Male and Five Female Vocational Preferences Plan Groups

Correlations with the First Two Discriminant Functions								
Interest scales	Males				Females			
	Sex-restrictive scales (ACT IV)		Sex-balanced scales (UNI-II)		Sex-restrictive scales (ACT IV)		Sex-balanced scales (UNI-II)	
	Function 1	Function 2	Function 1	Function 2	Function 1	Function 2	Function 1	Function 2
Science	.79	.14	.86	.22	.73	.50	.85	.11
Creative arts	.21	.32	.20	.30	.08	-.43	-.08	-.51
Social service	-.07	.35	-.05	.32	.18	-.49	.08	-.40
Business contact	-.53	.06	-.40	.31	-.42	-.02	-.29	-.16
Business detail	-.56	-.22	-.31	-.05	-.60	.60	-.35	.63
Technical	.73	-.75	.18	-.66	.14	.29	.12	.02
Barlett's χ^2	232.8	76.9	185.4	66.6	312.8	130.7	294.8	108.0
Degrees of freedom	10	8	10	8	9	7	9	7
Percentage of trace	64.2	18.0	64.4	20.4	66.0	24.7	70.8	23.2
Wilks' λ	$\lambda = .457$ (30,1966)		$\lambda = .542$ (30,1966)		$\lambda = .567$ (24,3029)		$\lambda = .610$ (24,3029)	
F ratio	F = 14.2		F = 10.8		F = 22.3		F = 19.2	

TABLE 2
Percentages of Correct Classifications of Six Male Vocational Preference Groups Using Sex-Restrictive and Sex-Balanced Scales

Classification method	Actual vocational preferences groups						Average correct classification ^a
	Agriculture	Engineering	"Hard" sciences	Business	Social sciences	Health	
Sex-restrictive scales							
Highest centour							
same as actual group	19.6	31.0	43.5	65.7	29.4	35.0	37.4
Either highest or second highest centour							
same as actual group	55.4	54.0	69.6	81.0	60.8	62.5	63.9
Sex-balanced scales							
Highest centour							
same as actual group	57.1	10.6	43.5	61.9	22.5	38.7	39.0
Either highest or second highest centour							
same as actual group	69.6	44.2	65.2	76.2	64.7	72.5	65.4

^aBased on unweighted average hit rate. Chance level of correct classification assuming random assignment is 1/6 or 16.7 percent of the highest centour and 2/6 or 33.3 percent for the two highest centours.

and Holland (1975) and by Prediger and Hanson (1974), when the interest scale distributions for men and women differ dramatically, widely divergent career suggestions are provided. If the scale distributions for men and women are highly similar, similar career options will be suggested. Tilton's overlap statistic (Tilton, 1937) was used to compare the similarity of interest scale distributions for men and women. This statistic indicates the percentage of scores obtained by the members of one group that may be matched by scores obtained in the other group. Table 4 shows the mean raw scores and the percentage overlap for men and women on the sex-restrictive and sex-balanced raw score scales. Results are shown for the four vocational preference groups with sufficiently large sample sizes of both men and women and for the total combined sample of men and women. For a majority of the comparisons (more than 80 percent), the sex-balanced scale distributions show a greater degree of overlap between men and women than do the sex-restrictive scales. In many cases, the sex-balanced scales show a much higher degree of overlap. For example, the percentage overlap of the sex-restrictive Technical scale for the Agriculture vocational preference groups is 60 percent, but the scores for men and women on the sex-balanced Technical scale overlap 94 percent. The men score at about the same level on the two types of scales (3.4 versus 3.5) while the sex-balanced Technical scale items elicit more like responses from women (3.4) than the sex-restrictive items (2.8). For the total sample, four of the six sex-restrictive scales overlap less than 80 percent for men and women. Based on these means, it appears that a larger proportion of males than females will receive high scores on the Science and Technical scales. A larger proportion of females than males will receive high scores on the Social Service and Creative Arts scales. In contrast, five of the six sex-balanced scales show a high degree of overlap (more than 90 percent) for men and women in the total sample. By using sex-balanced scales, the career suggestions provided to men and women would be highly similar.

DISCUSSION

The data suggest that the degree of differentiation among groups was highly similar for the two types of scales. Contrary to popular belief, items which are equally attractive to men and women do not appear to reduce the manner or degree in which interest inventory scales differentiate among vocational preferences groups. Put another way, one would expect students with different vocational choices to have different interest profiles. Sex-balanced scales do not reduce substantially

the ways in which these groups differ. The degree of group differentiation is very similar for sex-balanced and sex-restrictive raw score scales. Furthermore, the vocational preference groups differ in expected ways and the nature of the dimensions on which the groups differ are highly similar for both types of scales. The first discriminant factor was a weighted linear combination of the Science and Business scales for both instruments and for both sexes. Since the nature and number of the groups differed for men and women, the second discriminant factors were different for men and women but were similar from one instrument to the other within each sex group. The evidence suggests that the sex-balanced scales are measuring interest constructs which "work" very much like those measured by the sex-restrictive scales, thus supporting the construct validity of the sex-balanced scales.

A further indication of the criterion-related validity of the sex-balanced scales is the degree to which they accurately classify people into appropriate membership groups. Highly similar percentages of hits were obtained when the classifications were based on weighted linear composites (centour scores) of the two types of original variables. It remains to be shown whether classifications based on the original variables result in lower (or higher) hit rates for either type of scale. Lohnes (1961) suggested very similar classification hit rates for analyses conducted in discriminant space and original test space.

The evidence from this study clearly suggest comparable levels of criterion-related validity. What, if any, advantages are there in using sex-balanced rather than sex-restrictive interest inventory scales? At least two advantages seem evident. First, the development of sex-balanced scales essentially obviates the problem of what type of norms to use in reporting interest inventory results. With sex-neutral items, the raw score frequency distributions for a given scale should be nearly the same for both men and women. Hence, it will make little difference whether separate or combined sex groups are used to construct the normative sample, as the resulting distributions will be essentially the same. Since the raw score means will vary from scale to scale due to the nature of the items chosen for a given scale, it still will be necessary to convert raw scores to standard scores in order to make across-scale comparisons. Second, the development of sex-balanced scales should result in similar raw score interest-profiles for men and women with the same vocational aspirations, for men and women pursuing the same educational major, and for men and women in the same occupation. The preliminary evidence presented here suggests that the six sex-balanced scale distributions were more similar for general samples of college-bound men and women than the sex-restrictive scale distributions. The results should

TABLE 3
Percentages of Correct Classifications of Five Female Vocational Preference Groups Using Sex-Restrictive and Sex-Balanced Scales

Classification method	Actual vocational preference groups					Average correct classification ^a
	Agriculture	Business	Social sciences	Education	Health	
Sex-restrictive scales						
Highest centour same as actual group	10.2	73.1	43.1	7.7	60.5	38.9
Either highest or second highest centour same as actual group	45.8	74.9	59.3	62.1	65.4	61.5
Sex-balanced scales						
Highest centour same as actual group	5.1	60.6	48.8	12.8	70.3	39.5
Either highest or second highest centour same as actual group	32.2	65.1	64.2	62.6	75.5	59.9

^aBased on unweighted average hit rates. Chance level of correct classification assuming random assignment is 1/5 or 20 percent for the highest centour and 2/5 or 40 percent for the two highest centours.

TABLE 4
Means and Percentages Overlap of Sex-Balanced and Sex-Restrictive Raw Score Scales for Men and Women in Selected Criterion Groups

	Science			Creative arts			Social service			Business contact			Business detail			Technical		
	Overlap		Men	Overlap		Men	Overlap		Men	Overlap		Men	Overlap		Men	Overlap		Men
	Men	Women (%)		Men	Women (%)		Men	Women (%)		Men	Women (%)		Men	Women (%)		Men	Women (%)	
Agriculture																		
Sex-restrictive (ACT-IV)	3.2	2.7	76	2.6	3.4	60	2.5	2.8	84	3.3	3.8	66	2.8	3.2	80	3.4	2.8	60
Sex-balanced (UNI-II)	3.2	2.9	85	2.8	3.3	77	2.7	2.7	100	3.6	3.9	74	2.9	3.0	91	3.5	3.4	94
Business																		
Sex-restrictive	2.7	2.3	83	2.6	3.0	76	3.5	3.5	93	3.3	3.9	69	3.4	3.4	100	3.0	2.4	70
Sex-balanced	2.6	2.5	96	2.9	3.0	94	3.0	3.2	82	3.6	3.9	82	3.3	3.1	89	2.9	3.0	94
Social science																		
Sex-restrictive	3.0	2.6	83	3.0	3.4	79	2.7	2.7	100	3.6	4.2	61	3.1	3.2	95	3.0	2.4	64
Sex-balanced	3.0	2.8	90	3.3	3.4	93	2.7	2.6	93	3.9	4.2	79	3.3	3.2	94	3.0	3.0	100
Health																		
Sex-restrictive	3.9	3.3	71	3.0	3.1	94	2.7	2.8	95	3.5	4.0	61	3.0	2.9	97	3.2	2.6	65
Sex-balanced	3.9	3.6	83	3.3	3.0	86	2.7	2.6	96	3.8	4.0	78	3.1	2.9	87	3.1	3.1	100
Total sample																		
Sex-restrictive	3.3	2.8	78	2.8	3.2	79	3.3	4.0	58	3.0	3.1	94	2.8	2.9	95	3.2	2.5	59
Sex-balanced	3.3	3.0	91	3.1	3.1	100	3.7	4.0	78	3.1	3.0	93	2.8	2.8	100	3.1	3.1	100

be verified using individuals in a wider variety of criterion groups, however.

The results of this study are encouraging. The scales of the UNI-II are not perfect but, as a first attempt to develop sex-balanced scales, they work remarkably well. Eliminating interest inventory items with large sex differences and replacing them with sex-balanced items does not appear to reduce the effectiveness with which the scales discriminate among vocational preference groups. With additional refinement, sex-balanced scales may offer an attractive alternative to interest inventories which suggest restricted career options to men and women. In conclusion, the data suggest that sex differences in interest inventory item responses may not be a necessary concomitant of validity.

REFERENCE NOTES

1. Cole, N. S., and Hanson, G. R., "The Impact of Interest Inventories on Career Choice." Commissioned paper for the NIE Workshop on Sex Bias and Sex-Fairness in Career Interest Inventories, Washington, March 1974.
2. Hanson, G. R. *Assessing the Career Interests of College Youth: Summary of Research and Applications* (ACT Research Report No. 67). Iowa City, Iowa: The American College Testing Program, 1974.
3. Prediger, D. J. *Alternatives for Validating Interest Inventories Against Group Membership Criteria* (ACT Research Report No. 76). Iowa City, Iowa: The American College Testing Program, 1976.

REFERENCES

- Campbell, D. P. *Manual for the Strong-Campbell Interest Inventory*. Stanford: Stanford University Press, 1974.
- Diamond, E. (Ed.) *Issues of Sex Bias and Sex Fairness in Career Interest Inventories*. Washington: National Institute of Education, 1975.
- Gottfredson, G., and Holland, J. L. "Vocational Choices of Men and Women: A Comparison of Predictors from the Self-Directed Search." *Journal of Counseling Psychology* 22(1975): 28-33.
- Gottfredson, G., Holland, J. L., and Gottfredson, L. "The Relation of Vocational Aspirations and Assessments to Employment Reality." *Journal of Vocational Behavior* 7(1975): 135-148.
- Grandy, T. "Cross-Validation of the American College Testing Interest Inventory for University of Iowa Students." Unpublished doctoral dissertation, University of Iowa, 1975.
- Harmon, L. W. "Sexual Bias in Interest Measurement." *Measurement and Evaluation in Guidance* 4(1973): 496-501.
- Holland, J. L. *Making Vocational Choices*. Englewood Cliffs, N.J.: Prentice-Hall, 1973.
- Holland, J. L. "Some Guidelines for Reducing Systematic Biases in the Delivery of Vocational Services." *Measurement and Evaluation in Guidance* 6(1974): 210-218.
- Huberty, C. J. "Discriminant Analysis." *Review of Educational Research* 45(1975): 543-598.
- Huth, C. M. "Measuring Women's Interests: How Useful?" *Personnel and Guidance Journal* 51(1973): 539-545.
- Johansson, C. B., and Harmond, L. W. "Strong Vocational Interest Blank: One Form or Two?" *Journal of Counseling Psychology* 19(1972): 404-410.
- Lohnes, P. R. "Test Space and Discriminant Space Classification Models and Related Significance Tests." *Educational and Psychological Measurement* 21(1961): 559-574.
- Prediger, D. J., and Cole, N. S. "Sex-Role Socialization and Employment Realities: Implications for vocational interest measures." *Journal of Vocational Behavior*, 1975, 7, 239-251.
- Prediger, D. J., and Hanson, G. R. "The Distinction Between Sex Restrictiveness and Sex Bias in Interest Inventories." *Measurement and Evaluation in Guidance* 7(1974): 96-104.
- Prediger, D. J., and Hanson, G. R. "Holland's Theory of Careers Applied to Women and Men: Analysis of Underlying Assumptions." *Journal of Vocational Behavior* 8(1976): 167-184.
- Rayman, J. "Sex and the Single Interest Inventory: The Empirical Validation of Sex-Balanced Vocational Interest Inventory Items." Unpublished doctoral dissertation, University of Iowa, 1974.
- Rulon, P. J., Tiedeman, D. V., Tatsuoaka, M. M., and Langmuir, C. R. *Multivariate Statistics for Personnel Classification*. New York: Wiley, 1967.
- Schlossberg, N.K., and Goodman, J. "Imperative for change: Counselor use of the Strong Vocational Interest Blank." *Impact*, 1972, 2, 25-29.
- Tilton, J. W. "The Measurement of Overlapping." *Journal of Educational Psychology*, 28(1937): 656-662.

Toward Beneficial Resolution of the Interest Inventory Controversy

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Abstract. Several reasons are discussed for the current dissension about sex-fairness in interest measurement - lack of clarity or agreement on (a) the diverse purposes of vocational assessment, (b) differences in inventories and their effects, (c) the meaning of sex differences in inventory scores, (d) the way specific inventories have been developed, (e) how different methods for assessing validity can lead to different conclusions, and (f) definitions of fairness and bias. In

addition, a number of suggestions are offered to foster consensus on sex-fairness in interest measurement and inventory uses. These include recognition that several seemingly divergent definitions of bias may each have value, attention to the evaluation of the variety of potential effects of inventories on users, and attention to informing clients about the vocational treatments they receive.

Interest measurement specialists have spent considerable effort since the late 1960s examining vocational interest measurement in relation to problems of sex-fairness and vocational assistance for women.* These specialists have been concerned about the use of separate and unequal forms of interest inventories for women; they have been concerned with the equivalence of the structures of vocational interests for men and women; and some writers have suggested that separate (but presumably equal) vocational theories are needed for women. Several attempts have been made to produce inventories or score reports that minimize score differences between the average woman and the average man. Other research has assessed the effects of counseling or interest inventories on vocational exploration. Finally, measurement specialists have been concerned about the content or wording of assessment devices: Does the wording or the selection of items bias the assessment of men and women?

This effort has resulted in progress. Men's and women's forms of a widely used interest inventory have been merged as a result of some major compromises (Campbell, 1974). Although discussion continues about how to interpret scores that are reported on cross-sex norms on that inventory (Creaser and Carsello, 1976; Lunneborg, 1975), much has been learned from the experience. Research on the comparability of the structures of interests for men and women is less ambiguous

- they are largely the same (Hanson and Cole, 1973). Likewise, some authors (Holland and Gottfredson, 1976b; Krumboltz, 1976) have elaborated the ways in which a single theory can be used to explain the vocational behavior of both men and women, while others have provided evidence of when (Vondracek and Kirchner, 1974) and how (Kelso, 1976; Maccoby and Jacklin, 1974) sex differences and other differences in vocational behavior come about. It has become clearer that different vocational outcomes do not necessarily imply different processes of vocational development but instead may imply different social experiences that can be interpreted using a single theoretical perspective. Substantial research progress has also been made in the examination of the content of interest inventories (Boyd, 1975; Gottfredson, 1976a; Hansen, 1974; Holland and Gottfredson, 1976a; Rayman, 1974). The examination of alternative reporting procedures (Creaser and Carsello, 1976; Gottfredson and Holland, 1975; Hanson, Noeth and Prediger, in press; Lunneborg, 1975) remains more controversial.

Despite the insight gained from recent research, almost every aspect of interest inventory content and scoring remains an area of concern and dispute. In this paper we focus on what we judge to be six reasons for dissension about sex-fairness in interest measurement.

1. Failure to consider the diverse purposes of vocational assessment.
2. Failure to consider the differences among interest inventories and their potential effects.
3. Lack of clarity about the meaning of sex differences in scores.

*This paper is based on two earlier papers (Gottfredson, 1976b; Holland, 1977) that discuss the same topic. We are grateful to the following people for their helpful comments on this or the earlier papers: Linda S. Gottfredson, Ruth Leggin, Jack Rayman, Willo P. White, Jan B. Woodring.

4. Lack of understanding of the way some inventories have been developed.
5. Use of diverse procedures for assessing test validity.
6. Lack of agreement on the definition of fairness and bias.

Purposes of Assessment

The first reason we lack a consensus on sex-fairness in the composition and scoring of interest inventories is that these inventories have multiple purposes (Gottfredson, Holland and Gottfredson, 1975; Holland, 1975b; Holland and Gottfredson, 1976b). Inventories can reassure people who are unsure about their career goals. They can provide a structure that people can use in thinking about themselves and their careers. They can serve as career development diagnostic tools. They can promote exploration of a wide range of career alternatives. And they can focus exploration by suggesting a group of occupations that appear related to a person's interests.

The multiple purposes of interest assessment sometimes lead to divergent requirements for scoring and reporting procedures. For example, pooled-sex norms or ipsative scoring may be most useful for focusing exploration, while same-sex norms may lead to less focused exploration. At the extreme, random reports or no assessment provide no focus for exploration.

There are a variety of legitimate purposes for assessment. To make productive use of vocational assessment, users must be clear about their purposes in any particular instance. Different people may need or desire different treatments. Exploration, reassurance or diagnostic precision may be appropriate for different people, or at different times for the same person. In any event, the fair use of vocational assessment implies that counselors must be open and clear with clients about the nature of the treatment they are getting—for any assessment experience is also a treatment.

Inventory Differences

Interest inventories are constructed in diverse ways, and they probably achieve their effects on people in diverse ways. Some devices employ narrow band measurement and others attempt to assess broad dimensions of interest. Some are limited only to interest items, and others include interest and competency items. Some rely heavily on skilled counselors or computer scoring to assist in interpretation, and others minimize the need for costly, time-consuming or training-intensive procedures. Some inventories make the structure of the interests readily apparent to clients, and others show the struc-

ture only after the inventory is scored and interpreted. Despite considerable speculation about the best way to measure or report vocational interests, there is no compelling evidence that any one method is better than another or that a particular effect can be achieved by only one method. Evaluations of three inventories developed with divergent rationales and techniques suggest that their effects are similar (Cooper, 1976; Prediger, McLure and Noeth, 1976; Zener and Schnuelle, 1976). At present, the relation between an inventory's special characteristics and its effects are unclear. More research into how inventories achieve their effects should promote the design of better devices and clarify the relation of inventory design to inventory effects.

Sex Differences

A third reason for lack of consensus is the belief that sex differences in interest inventory scores are artifactual. Disagreement about the meaning of sex differences is fostered by divergent perspectives on the extent to which a person's learning experiences should be allowed to influence scores.

More careful attention to the purposes of assessment may resolve this disagreement. If the goal is to indicate a person's current vocational status, scores will often show the consequences of sex-related socialization. In this case, any procedure that removes sex differences in scores can be expected to decrease construct validity because the personality constructs measured are, in theory, dependent upon a person's experience, and at the present time this experience is usually different for men and women. The removal of sex-related variance in the scores appears akin to the efforts in an earlier decade to remove social desirability from measures of personal adjustment. Social desirability seems to be a component of adjustment, and devices that eliminate it appear less valid than those that do not.

On the other hand, when exploration is the goal, valid assessment of current status becomes less important, and scores need not reflect sex differences in personal histories. Likewise, when explicit attempts are made to influence a person to abandon traditionally held sex-role preferences, vocational interventions might not need to include an assessment of a person's current status at all.

Test Development

Another reason for the lack of consensus about interest inventory composition is that detailed reports of inventory development have sometimes not been made widely available and the existing reports have not generated reader interest. Consequently, the recent revision of the Vocational Preference Inventory (Hol-

TABLE 1
Typical VPI Items

Item	Correlations						Sample
	Real.	Inv.	Art.	Soc.	Ent.	Conv.	
Credit Investigator (C)	.08	-.03	-.10	.20	.44	.53	Men ^a
	.07	-.03	-.12	.10	.45	.72	Women ^a
	.17	.03	.01	.25	.42	.57	Men ^b
	.16	-.17	-.23	.00	.46	.78	Women ^b
	.24	-.10	-.18	.14	.28	.32	Boys ^c
	.05	-.12	-.02	.08	.07	.22	Girls ^c
	.30	.15	-.08	.06	.42	.48	Men ^d
	.10	-.11	-.04	.20	.57	.56	Women ^d
	.02	.17	.64	.28	.00	-.05	Men ^a
	.07	.17	.63	.20	.12	-.24	Women ^a
Poet (A)	-.28	.18	.65	.39	.06	-.02	Men ^b
	-.03	.22	.76	.32	.04	-.41	Women ^a
	-.17	.21	.49	.17	-.17	-.96	Boys ^c
	.22	-.06	.53	.08	.08	.07	Girls ^c
	-.08	-.12	.67	.14	-.03	-.15	Men ^d
	.13	.14	.60	.25	.16	.06	Women ^d
	.16	.18	.29	.60	.24	.14	Men ^a
	.07	.26	.17	.58	.14	-.01	Women ^a
	-.01	.06	.25	.60	.43	.29	Men ^b
	.16	.21	.24	.66	-.16	-.07	Women ^b
Speech Therapist (S)	-.15	.26	.18	.61	.10	.26	Boys ^c
	.19	.11	.31	.57	.24	.15	Girls ^c
	.08	-.04	-.03	.52	-.06	.04	Men ^d
	.22	.16	.08	.32	.00	.14	Women ^d

We thank Geoffrey Kelso for drawing these three item cards at random from a deck containing all items included in the seventh revision occupational scales.

^aAccidental samples of men (n = 157-161) and women (n = 144-146) from a variety of college and employment settings.

^bMen (n = 45-46) and women (n = 37) tested at a fair in an industrial area outside Baltimore.

^cUrban high school boys (n = 71) and girls (n = 90) enrolled in a private suburban girls' high school.

^dMen (n = 93-94) and women (n = 92-96) attending a Canadian college.

TABLE 2
Selected Poor Items

Item	Correlations						Sample
	Real.	Inv.	Art.	Soc.	Ent.	Conv.	
Different patterns of correlations for men and women							
Dressmaker/tailor	.23	.25	.28	.09	.02	.04	Men ^a
	.44	.09	.23	.19	.12	.14	Women ^a
	-.04	-.13	.26	.27	.13	-.03	Boys ^b
	.33	-.06	.35	.07	.37	.29	Girls ^b
Hair stylist	.03	.03	.27	.08	.14	.00	Men ^c
	.11	-.08	.10	.13	.29	.24	Women ^c
Military Officer	.20	-.14	.00	.12	.43	.27	Men ^c
	.39	.23	.16	.22	.24	.26	Women ^c
Police Officer	.16	.10	-.02	.14	.17	.15	Men ^c
	.26	.10	.09	.28	.37	.30	Women ^c
	.45	.04	-.30	.29	.18	.10	Boys ^b
	.29	.03	.18	.23	.36	.16	Girls ^b
	.40	.16	.09	.29	.06	.03	Men ^a
	.26	.28	-.02	.18	.08	.15	Women ^a
Not clearly related to any one scale							
Cook/Chef	.16	.18	.25	.10	.32	.20	Boys ^b
	.27	.10	.27	.04	.30	.24	Girls ^b
	.18	.16	.34	.23	.17	.01	Men ^a
	.45	.07	.19	.09	.20	.15	Women ^a
Homemaker	.30	-.02	-.08	-.04	.11	.19	Men ^a
	.14	.03	-.01	.31	-.01	.14	Women ^a
	-.03	.16	.25	.12	.29	.43	Boys ^b
	-.03	-.16	-.11	.05	.01	.03	Girls ^b
Industrial relations consultant	.06	.18	-.06	.27	.35	.31	Boys ^b
	.24	.49	.18	.11	.44	.34	Girls ^b
Sewing machine operator	.19	.07	.02	-.01	.07	.19	Men ^a
	.31	.14	.17	.20	-.01	.16	Women ^a
	.17	.16	.32	.04	.10	.17	Boys ^b
	.21	.18	.29	.18	.28	.14	Girls ^b
Veterinarian	.32	.67	.41	.32	.11	.04	Men ^c
	.41	.57	.32	.25	.23	.02	Women ^c
	.06	.20	-.03	.27	.07	.04	Boys ^b
	.17	.28	.12	.42	.13	.11	Girls ^b
	.35	.39	.00	.04	-.01	.01	Men ^a
	.44	.48	.00	-.06	-.14	.06	Women ^a

Note. All correlations over .3 or the highest correlations in a row are italicized.

^aCanadian college men (n = 89-95) and women (n = 91-95).

^bUrban high school boys (n = 70-71) and girls (n = 90).

^cAccidental sample composed of college men and employed men (n = 158-162) and college women and employed women (n = 145-146).

land, 1975a; Gottfredson, Holland and Holland, 1977) will be used to provide a specific illustration of inventory evolution. An appreciation of this process may reduce some misunderstanding.

The VPI is composed entirely of occupational titles and provides scores on six homogeneous scales intended to assess the major dimensions of vocational interests. This device has undergone seven published revisions and several unpublished item analyses since the 1950s. The reasons for another revision were to improve the sex-fairness and psychometric properties of the inventory and to modernize its content.

The concern about the sex-fairness of the VPI and other devices employing homogeneous scales has resulted primarily from the mean differences obtained between men's and women's scores, from the inclusion of words like "policeman" or "salesman" that were not gender-neutral, and from doubts about the selection of items for inclusion- the belief being that equally useful items that do not result in sex differences in scores could be found.

We examined the effect of word endings (Gottfredson, 1976a) and discovered that changing "salesman" to "salesperson," for example, did not change women's scores. In addition, Boyd (1975) obtained similar results in a more comprehensive study. At the same time we learned that making this kind of word ending change did not harm item validity. Consequently the Seventh Revision of the VPI includes only items with gender-neutral endings, and publishers who adopted this revision without doing the research can breathe a sigh of relief. Although these changes probably have not reduced sex differences in total scores, they have not ruined the devices.

We also considered many occupational titles that might be both valid and result in decreased sex differences in total scores. Some items were discarded before collecting any new data because trials in earlier item analyses in the VPI's history indicated that these items would not scale properly. The pool of items that remained were tested in a series of item analyses. In contrast to some textbook descriptions of item analyses that characterize scale construction as a one-shot affair, item selection for the VPI proceeded in a sequence of analyses in several samples. To be included in a scale, an item must scale properly in all samples. Table 1 shows the results of this kind of analysis for a random sample of items in the Seventh Revision. Each item scales properly for both sexes in a variety of samples. Table 2 shows the results for some rejected items. The rejected items, e.g. sewing machine operator, correlate with different scales in different samples, do not correlate with the intended scale, or do not work in the same way for both sexes.

This method of scale construction selects robust items—items that work in about the same way in a variety of samples and for both sexes. Note that conducting the item analyses in this way insures the inclusion of sex-fair items by one criterion: items correlate with the total score to about the same degree for both sexes.

Following a suggestion by Tittle (undated), an additional check on sex-fairness was conducted for every item in the revised VPI. Items were examined by the procedure described by Echternacht (1974) to detect item-group interaction. No item failed this test for item-sex interaction. As a way of assessing the efficiency of this test, some items that were rejected during the earlier item analyses were also examined. These items also passed the test.

We learned two things through this set of analyses: (a) the VPI items survived a specific statistical challenge, and (b) the Echternacht procedure is not much of a challenge. The item analysis procedures seem to be a more powerful safeguard against bias than the procedure recommended by Tittle.

Any item that did not work well for both sexes was discarded in the item analyses. Because an item must have passed not one, but a series of these tests, this process weeded out even marginal items. And because most items in the VPI have survived not only the present item analyses, but also a succession of item analyses in the past 25 years using samples from a variety of sources, we can expect the items to work well in a broad range of samples and for both sexes.

Although the contents of Table 1 are encouraging, a second outcome of these item analyses is disappointing. We were able to find only a few good substitute items that reduced male-female score differences. The use of these new items reduces sex differences slightly, but the changes are very small. A more complete description of the results is given by Gottfredson, Holland and Holland (1977).

Parenthetically, we do not believe that the way the VPI has evolved is the only way to develop an inventory. In addition, no development procedure can guarantee that a test will have beneficial effects in practical applications. Nevertheless, the foregoing description of VPI development may reduce some misunderstanding.

Assessing Validity

A fifth reason for lack of agreement about sex-fairness is that different authors define and assess validity in different ways. Partly because of the complexities in validating interest measures against job satisfaction, test developers have often assessed the efficiency with which interest inventories can forecast a

person's career choice or actual occupation. The assumption underlying this procedure is that, other things being equal, people will enter and remain working at occupations they find satisfying.

The evaluation of an inventory against the seemingly straightforward criteria of occupation or vocational choice has resulted in some confusion. A common procedure is to group actual occupations according to a classification scheme, assign people to a predicted category based on their interest scores and tally agreement between the interest results and the occupational groups to which people actually belong on followup. Interest scores can be used in a variety of ways to assign people to predicted categories. People have been categorized according to high-point raw score codes, high-point same-sex normed scores or discriminant scores. In addition, agreement between interest scores and occupational groupings have been assessed in different ways: percentage agreement that reflects category size, percentage agreement that ignores category size and an agreement index (kappa) that excludes agreement due to chance from the tally (Cohen, 1960; Tinsley and Weiss, 1975).

Because the different statistical procedures used to establish validity can suggest different interpretations, disagreement may result. Discriminant function analyses show that inventories composed of scales which minimize sex differences, called balanced scales, have some concurrent validity (Hanson and Rayman, 1976). It has been argued then that use of the balanced scales is preferable to the use of traditional scales because the discriminant scores derived from these scales can be used to predict occupational group membership almost as efficiently within sex as can discriminant scores derived from scales showing larger sex differences. What the results show, however, is that the weighted linear composites derived from sex-balanced scales have some usefulness. Such within sex discriminant analyses have no clear relevancy to discussions of sex differences in central tendency (i.e., means) of the original scores. Instead, the predictive results apply to the linear composites from the discriminant analysis. This distinction has not been made clear in the literature on sex-fairness.

The meanings of percentage of agreement are also sometimes unclear. A high overall percentage agreement may result because of a high degree of correct identification of large criterion groups combined with lower efficiency in identifying members of relatively small groups. In contrast, procedures that ignore category size by averaging the percentage agreement across criterion categories without taking category size into account may not reveal large absolute numbers of misidentified people in the larger criterion categories.

An example illustrates the percentage agreement problem. Table 3 is adapted from a report by Hanson, Noeth and Prediger (in press) which compares different scoring procedures for predictive efficiency. The table is simplified by showing only the results for raw score high-point codes and same-sex standard scores for women. To illustrate the difference between overall hit rates and unweighted average hit rates, columns showing the numbers correctly predicted were calculated from information in the Hanson et al. report. These numbers were then used to calculate the overall hit rate which was not reported by Hanson et al. Unfortunately, insufficient data were reported to calculate kappa.

The overall hit rates and the unweighted average hit rates in Table 3 can suggest divergent interpretations. Because the unweighted average hit rate method ignores criterion group size, it gives the same weight to the low hit rate for the enterprising category ($n = 37$) as to the high hit rate in the social category ($n = 260$). As a result, a scoring procedure which correctly identifies many common events, but which fails to identify large numbers of rare events can obtain a relatively low unweighted average hit rate: raw scores 36 percent, same-sex standard scores 44 percent. In contrast, the overall hit rates were 61 percent for raw scores and 48 percent for same-sex standard scores.

In some cases, large hit rates can be obtained simply by chance. For this reason, we have adopted the practice of reporting kappa, an index of agreement that eliminates agreement due to chance. Readers interested in comparing kappas to hit rates can examine the results in Gottfredson and Holland (1975), where some of the paradoxes in assessing hit rates are discussed in a different way and for different data. These paradoxes are discussed from a different perspective by Prediger (1977).

One way of promoting consensus about the predictive efficiency of different scoring procedures would be to report both types of hit rates or to provide enough detail for readers to calculate them and to report or provide data for computing kappa as well.

Definitions of Fairness and Bias

A sixth reason for the lack of consensus about sex-fairness in interest measurement is that agreement on definitions of bias is lacking. Instead of agreement, there are multiple definitions (Department of Health, Education and Welfare, 1975, section 86.36; Diamond, 1975; Holland, 1975b; Prediger and Hanson, 1974; "Separate Sex Norms Must Meet OCR Regulations," 1976). Without agreement on a single definition, there can be no conclusive test of an inventory for bias. Put another way, different criteria or definitions will lead to differ-

TABLE 3

An Illustration of Two Ways of Assessing Hit Rates (Percents)

Criterion group	Raw scores		Same-sex standard scores		<u>n</u>
	Number ^a correctly identified	Percent correctly identified	Number ^a correctly identified	Percent correctly identified	
Realistic	0	0	13	45	(29)
Investigative	---	---	---	---	--- ^b
Artistic	8	44	8	44	(18)
Social	218	84	140	54	(260)
Enterprising	9	24	14	38	(37)
Conventional	24	30	31	39	(80)
Total number correctly identified	259		206		
Unweighted avg. hit rate	36		44		
Overall hit rate	61		48		

^aCalculated from Hanson, Noeth and Prediger (in press, Table 1).^bResults for women in this category were not shown in the Hanson et al. report.

ent conclusions about the absence or presence of sex bias. Recent discussions by Herman (1977) and Schaffer (1977) illustrate some of the issues and dilemmas created by the *Title IX Guidelines* (U.S. Department of Health, Education and Welfare, 1975).

Because interest inventories have multiple uses, the divergence of opinion about definitions is not surprising. We may be able to promote progress in sex-fairness by keeping the many uses of inventories in mind when assessing an inventory, scoring procedure, or counseling application for possible bias.

Toward Fairer Use of Interest Inventories

We suggest that everyone can agree on three points: (a) Both the counselor and the client should be clear about the purpose of the intervention at hand. (b) Any intervention that is characterized to the client as an assessment should have good construct validity and the nature of the constructs and scoring procedures involved should be clear to both the counselor and the client. This implies that assessment be made an open learning experience for the person assessed (cf. Dailey, 1971, on the qualities of good assessment). (c) Research and evaluation will make more useful contributions to the development of helpful interventions than untested speculations about the fairness of particular procedures.

Finally, the following suggestions may foster a consensus on sex-fairness in interest measurement and stimulate the fair use of vocational interventions:

1. Recognize that assessment has multiple purposes, and that these purposes may sometimes be in conflict.
2. Recognize that for some purposes interest scores should, at the present time, reflect the sex-related differences in people's learning histories.
3. Assume that any definition of sex bias has some value or usefulness. Test a proposed definition in experiments devised to learn what actually happens when a treatment or inventory is used with men and women. If undesirable outcomes occur, find a way to overcome that undesirable effect. Explore what a particular solution does and does not accomplish.
4. Learn more about the consequences of using different kinds of inventories through research to evaluate these interventions. This research should consider as outcome variables a wide range of purposes of vocational interventions—exploration, personal insight, self-confidence, predictive validity, occupational knowledge, diagnostic usefulness—and not be limited to a single purpose.
5. Continue to study the antecedents of mature vocational interests. By learning how interests develop we may learn how to influence their development in beneficial ways.

6. Use the knowledge gained through research and evaluation to create new interventions with stronger and more beneficial effects. Disseminate this knowledge with trainers and resource materials.

7. Explain routinely and in an explicit way to consumers what a proposed vocational treatment may do to them so that they have the option of accepting or rejecting a treatment. Everyone should have the explicit right to accept or reject treatment. Testing, scoring, norming and special reporting procedures should be explained in plain English.

8. Develop a healthy skepticism about untested intuition. Too often, participants in this controversy have acted as if untested intuitions were equivalent to the results of a program of research.

Boyd, V.S. "The Linguistic Structure of the Self-Directed Search: A Study of Sex-Role Stereotyping." Unpublished doctoral dissertation, University of Maryland, College Park, 1975.

Campbell, D.P. *Manual for the Strong-Campbell Interest Inventory T-325 (Merged Form)*. Stanford: Stanford University Press, 1974.

Cohen, J.A. "A Coefficient of Agreement for Nominal Scales." *Educational and Psychological Measurement* 20(1960): 37-46.

Cooper, J.F. "Comparative Impact of theSCII and the Vocational Card Sort on Career Exploration of Women." *Journal of Counseling Psychology* 23(1976): 348-352.

Creaser, J. and Carsello, C. "Comparability of Cross-Sex Scores on the Strong-Campbell Interest Inventory." *Journal of Counseling Psychology* 23(1976): 360-364.

Dailey, C.A. *Assessment of Lives*. San Francisco: Jossey-Bass, 1971.

Department of Health, Education and Welfare, U.S. "Nondiscrimination on the Basis of Sex in Educational Programs and Activities Receiving or Benefitting from Federal Financial Assistance." *Federal Register* 40(1975): 24128-14145.

Diamond, E., editor. *Issues of Sex Bias and Sex-Fairness in Career Interest Measurement*. Washington: National Institute of Education, 1975.

Echternacht, G. "A quick Method for Determining Test Bias." *Educational and Psychological Measurement* 34(1974): 271-280.

Gottfredson, G.D. "A Note on Sexist Wording in Interest Measurement." *Measurement and Evaluation in Guidance* 8(1976): 221-223.

Gottfredson, G.D. "Good Items, Bad Items, Sex and the Vocational Preference Inventory." Paper presented at the American Psychological Association Convention, Washington, September, 1976.

Gottfredson, G.D., and Holland, J.L. "Vocational Choices of Men and Women: A Comparison of Predictors from the Self-Directed Search." *Journal of Counseling Psychology*, 22(1975): 28-34.

Gottfredson, G. D., Holland, J. L. and Gottfredson, L.S. "The Relation of Vocational Aspirations and Assessments to Employment Reality." *Journal of Vocational Behavior* 7(1975): 135-148.

Gottfredson, G.D., Holland, J.L., and Holland, J.E. "The Seventh Revision of the Vocational Preference Inventory."

- Paper presented at the American Personnel and Guidance Association Convention, Dallas, March, 1977.
- Hansen, J.C. "Coding Strong Vocational Interest Blank Items According to Holland's Theory of Personality Types." Unpublished doctoral dissertation, University of Minnesota, 1974.
- Hanson, G.R., and Cole, N.S., editors. *The Vocational Interests of Young Adults (Monograph 11)*. Iowa City: ACT Publications, 1973.
- Hanson, G.R., Noeth, R.J., and Prediger, D.J. "The Validity of Diverse Procedures for Reporting Interest Scores: An Analysis of Longitudinal Data." *Journal of Counseling Psychology*, in press.
- Hanson, G.R., and Rayman, J. "Validity of Sex-Balanced Interest Inventory Scales." *Journal of Vocational Behavior* 9(1976): 279-291.
- Herman, D.O. "Separate-Sex Norms and Title IV: Measurement Issues." Paper presented at the American Personnel and Guidance Association Convention, Dallas, March, 1977.
- Holland, J.L. *Manual for the Vocational Preference Inventory*. Palo Alto: Consulting Psychologists Press, 1975.
- Holland, J.L. "The Use and Evaluation of Interest Inventories and Simulations." In Diamond, E., editor. *Issues of Sex Bias and Sex-Fairness in Career Interest Measurement*. Washington: National Institute of Education, 1975.
- Holland, J.L. "Toward Definable and Beneficial Resolutions of the Interest Inventory Controversy." Unpublished paper, Johns Hopkins University, Department of Social Relations, 1977.
- Holland, J.L. and Gottfredson, G.C. "Sex Differences, Item Revisions, Validity and the Self-Directed Search." *Measurement and Evaluation in Guidance* 8(1976): 224-228.
- Holland, J.L. and Gottfredson, G.D. "Using a Typology of Persons and Environments to Explain Careers: Some Extensions and Clarifications." *Counseling Psychologist*, 6(1976): 20-29.
- Kelso, G.I. "Explorations of the Developmental Antecedents of Holland's Occupational Types." Unpublished doctoral dissertation, Johns Hopkins University, 1976.
- Krumboltz, J. "A Social Learning Theory of Career Selection." *Counseling Psychologist* 6(1976): 71-81.
- Lunneborg, P.W. "Interpreting Other Sex Scores on the Strong-Campbell Interest Inventory." *Journal of Counseling Psychology* 22(1975): 494-499.
- Maccoby, E.E. and Jacklin, C.N. *The Psychology of Sex Differences*. Stanford: Stanford University Press, 1974.
- Prediger, D.J. "Alternatives for Validating Interest Inventories Against Group Membership Criteria." *Applied Psychological Measurement* 1(1977): 275-280.
- Prediger, D.J. and Hanson, G.R. "The Distinction Between Sex Restrictiveness and Sex Bias in Interest Inventories." *Measurement and Evaluation in Guidance* 7(1974): 96-104.
- Prediger, D.J., McLure, G.T. and Noeth, R.J. "Promoting the Exploration of Personally Relevant Career Options in Science and Technology" (final report to National Science Foundation). Iowa City: American College Testing Program, 1976.
- Rayman, J. *Sex and the Single Interest Inventory: An Empirical Validation of Sex-Balanced Vocational Interest Inventory Items*. Unpublished doctoral dissertation, University of Iowa, 1974.
- Schaffer, W.M. "Separate-Sex Norms for Tests: Status Under Title IX." Paper presented at the Annual Convention of the American Personnel and Guidance Association, Dallas, March, 1977.
- "Separate Sex Norms Usage Must Meet OCR Regulations." *APGA Guidepost*, July 22, 1976, p. 12.
- Tinsley, H.E.A. and Weiss, D.J. "Interrater Reliability and Agreement of Subjective Judgments." *Journal of Counseling Psychology*, 22(1975): 358-376.
- Tittle, C.K. "Fairness in educational achievement testing." Unpublished manuscript, Queens College, City University of New York, undated.
- Van de Geer, J.P. *Introduction to Multivariate Analysis for Social Sciences*. San Francisco: Freeman, 1971.
- Vondracek, S.I. and Kirchner, E.P. "Vocational Development in Early Childhood: An Examination of Young Children's Expressions of Vocational Aspirations." *Journal of Vocational Behavior* 5(1974): 251-260.
- Zener, T.B. and Schnuelle, L. "Effects of the Self-Directed Search on High School Students." *Journal of Counseling Psychology* 23(1976): 353-359.

The Validity of Diverse Procedures for Reporting Interest Scores: An Analysis of Longitudinal Data

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Abstract. The purpose of this study was to compare the criterion-related validity of four procedures for reporting the results of interest inventories measuring basic types of interests. Three of the reporting procedures—interest profiles based on raw scores, combined-sex norms and same-sex norms—are in common use. The fourth procedure, which bases profiles on opposite-sex norms, has recently been advocated. For each of the reporting procedures, the correspondence between the high point interests codes and actual criterion group membership was determined. Two samples were involved. One consisted of 2,594 community college students who took the Vocational Interest Profile in 1970 and

were surveyed subsequently in 1975. The other consisted of 1,825 college-bound high school students who took the ACT Interest Inventory in 1972 and were followed-up three years later. Results show that the criterion-related validity of scores based on same-sex norms is as high as or higher than that of the other procedures for both males and females. A significant characteristic of reports based on same-sex norms is that they suggest similar vocational options to males and females whereas the other reporting procedures typically suggest options traditional for a person's sex. Implications for counselors are noted.

Many interest inventories in common use (e.g., the Kuder General Interest Survey, Ohio Vocational Interest Survey, Self-Directed Search, ACT Interest Inventory) report scores for general types of career interests (e.g., mechanical, clerical, social, etc.). Even the "Strong," which is normally thought of as focusing on specific occupations, provides scores for the six Holland interest types and 23 additional general interest areas. This paper compares the criterion-related validity of various score reporting procedures used by inventories that assess general types of career interests.

If interest inventories have any impact on counselees, it is through the career suggestions they provide. However, the career suggestions provided are a function of the reporting procedures that are used. Certain procedures suggest dramatically different career options to men and women (Cole and Hanson, 1975; Gottfredson, Holland and Gottfredson, 1975; Prediger and Hanson, 1974, in press). Interest profiles based on raw scores or combined-sex norms suggest technical, scientific and business careers much more frequently to men than women, and social service, artistic and clerical careers much more frequently to women than men. In contrast, profiles based on same-sex norms provide similar career suggestions to general samples of males and females (e.g., see references cited above). All three reporting procedures are in common use. A fourth procedure, score profiles based on opposite-sex norms, has recently been advocated by the Office of Civil Rights

("Separate Sex Norms," 1976). Prediger (1976a) has shown that opposite-sex norms produce career suggestions for males and females as divergent as those typically provided by raw scores and combined-sex norms.

Because various interest inventories use different reporting procedures and because these procedures produce different types of career suggestions, counselors are faced with a dilemma when they select an interest inventory. Hence, evidence comparing the criterion-related validity of the various reporting procedures should be of value. Before useful comparisons can be made, however, it is important to ask, "Validity for what?" The manner in which validity is determined must be relevant to the use being validated.

In the counseling setting, interest inventories are typically used to suggest occupations for counselees to consider or to help counselees examine the congruence between measured interests and occupations already under consideration. Yet, the validity of interest inventories is typically reported in terms of their ability to predict which counselees will enter or prefer various occupations. Because, as Berdie (1970) has noted, few counselors are interested in predicting whether a counselee will enter (or prefer) occupation A or occupation B, validity data for this use of interest inventories is not directly relevant to common counseling applications.

The implications of interest inventory applications for the validation procedures that are used are discussed

at length by Prediger and Cole (1975) and Prediger (in press). The recommended strategy for validating common counseling uses of interest inventories involves determination of the number of persons in an occupational criterion group who would have been asked to consider the occupation on the basis of interest inventory scores obtained some years earlier. It is important to note that relative sizes of the criterion groups are irrelevant in this approach to validation. That is, one would hope that interest inventory results for a large proportion of the members of each criterion group would be appropriate for the group, regardless of criterion group size. For example, an interest inventory should have suggested sales to a large proportion of the persons who eventually entered sales-related occupations, teaching to a large proportion of future teachers, etc. An interest inventory with poor criterion-related validity would have suggested sales (or teaching) to a few, if any, of the criterion group members. Thus, various reporting procedures can be compared in terms of their criterion group hit rates determined in this manner. The higher the hit rate when averaged across the criterion groups, the more valid a given procedure would be for counseling students.

The difference between this validation strategy and a strategy based on the prediction of future preference or occupation may appear to be minor. However, as noted below, Prediger (in press) has shown that the two validation strategies can provide quite different results for the same set of data. This usually happens when there are substantial differences in criterion group sizes.

Few studies have compared the criterion-related validity of various reporting procedures, although the problem has been identified as a significant one (Harmon, 1976; Holland, 1975). In a longitudinal study of the validity of Self-Directed Search (SDS) raw scores and standard scores (same-sex norms), Gottfredson and Holland (1975) found that the two reporting procedures were equally accurate in predicting the future occupational preferences of men. For women, raw scores produced higher hit rates, but both types of reporting procedures provided predictions less accurate than predictions which ignored SDS scores and simply assigned all women to the largest criterion group (i.e., predictions using base rate information).

The focus of the Gottfredson-Holland study was on predicting a person's subsequent occupational preference, though few counselors are interested in making such predictions, as noted above. Prediger (in press) reanalyzed the data for women to determine the validity of the two reporting procedures in identifying occupations for consideration during counseling. The overall validities of raw scores and same-sex standard scores were about the same though validities differed for

specific criterion groups. Hit rates for both reporting procedures beat the base rates.

Similar results were obtained by Prediger and Hanson (in press) in a study of more than 10,000 college seniors in 18 educational majors. Each of the 18 college majors was assigned to one of Holland's six types (Holland, 1973). Criterion group hit rates for ACT Interest Inventory (ACT-IV) raw scores and same-sex standard scores were compared using two classification procedures—ACT-IV high-point codes and centours based on discriminant functions (Rulon, Tiedeman, Tatsuoka and Langnuir, 1967). The results for the high-point code analysis showed that, for both sexes, same-sex standard scores have greater overall validity (higher hit rates) than raw scores. The average hit rates for centours based on raw scores and same-sex standard scores were nearly identical.

The studies cited above compare the criterion-related validity of two procedures for reporting interest results. The general purpose of the current study was to extend the comparisons to additional reporting procedures and to a wider variety of criteria and samples. More specifically, the criterion-related validities of interest score reports based on same-sex norms, combined-sex norms, opposite-sex norms, and raw scores were compared in two longitudinal studies. Criteria included current occupation and college major. Attention was focused on the validity of the reporting procedures for helping counselees identify career options to consider rather than on predicting which occupation or college major they would eventually enter.

STUDY ONE

Method

Sample. The initial target sample ($N = 4,350$) for the first study was selected for the national norming sample ($N = 22,342$) for the ACT Career Planning Program (ACT, 1972). All students in the norming sample completed the ACT Vocational Interest Profile (VIP) as they began vocational, technical and transfer programs at 110 community colleges, junior colleges, technical schools and similar kinds of institutions across the nation. Members of the target sample were selected according to the educational programs in which they initially enrolled in 1970. Both males and females were selected from business and marketing, accounting, science, social science and arts and humanities programs. Males were selected from electrical engineering technology and auto mechanics and females from nursing programs as very few members of the opposite sex originally enrolled in these programs.

Data Collection. Follow-up data were collected be-

tween January and June 1975, and included survey mailings to individuals and their parents and telephone calls to nonresponders. Mailings were also made to institutions for address updating when necessary. An overall response rate of 60 percent ($N = 2,594$) was obtained. This was equivalent to a 95 percent return rate from those individuals for whom accurate addresses could be obtained.

Instruments. The VIP is a 100 item inventory which reports scores on eight scales: Science, Creative Arts, Business Detail, Business Contact, Health, Social Service, Technical and Trades. Coefficient alpha estimates of reliability for the eight scales range from .86 to .96 for men and .87 and .93 for women in the national norm group. A detailed description of the technical characteristics of this instrument is provided elsewhere (ACT, 1972). The follow-up survey covered educational history, employment history, future employment plans and job satisfaction, including both specific aspects and overall satisfaction.

Analyses. Before data analyses were conducted, the study sample was screened on several variables. Sample members who had not completed the VIP, who were unemployed, or who failed to indicate a future job if still enrolled in college were excluded from this study. Each individual's current (or future) job was classified into one of the following categories: science, creative arts, social service, business contact, business detail and technical. These categories correspond directly to six of the VIP scales. Two of the categories, science and creative arts, included only students who expected to obtain jobs in these areas. Few students had actually obtained jobs in these categories at the time of the follow-up because such jobs typically require at least four years of postsecondary education. No additional screening was done for individuals in these two areas.

Men and women in the social service, business contact, and business detail areas, and men in the technology area were also excluded from the sample if they did not meet the following criteria: had worked for four or more months on the job, had expressed a feeling of overall satisfaction with their jobs and had expressed a feeling of satisfaction with the work itself. Because the sample was relatively small, females in the technology occupational area were screened only on overall job satisfaction. Females in the science group were excluded from the analyses because of the small sample size. Screening procedures resulted in a total sample size of 1,073 individuals.

After all screening was complete, each individual's highest interest score (high point code) was determined, separately, for VIP raw scores, same-sex standard scores, combined-sex standard scores and opposite-sex standard scores. Only the VIP scales corresponding to the

criterion groups were used. The high point code based on 1970 VIP results was then matched against criterion group membership. A "hit" was tallied when the high point code and criterion group corresponded. Hit rates were determined separately for each of the four reporting procedures.

Results

The results of the VIP high point code analyses are presented in Table 1. Overall hit rates were based on the unweighted average hit rate across the criterion groups. This procedure treats criterion groups as having equal importance as occupational options in counseling applications of interest inventories (Prediger, in press). For males, the overall hit rate for the six occupational groups was 26 percent for the opposite-sex standard scores, 33 percent for raw scores and 38 percent for both the same-sex and combined sex standard scores. The reporting procedure that provided the highest percentage of correct hits differed within specific occupational categories.

Another way to determine the usefulness of the various reporting procedures is to examine whether the appropriate high point interest code was the most frequent code for each of the criterion groups. (Data bearing on this question, though not reported in Table 1, are available from the senior author.) For example, one would expect a larger number of people in social service occupations to have obtained their highest interest score on the Social Service scale than on any other scale. When opposite-sex standard scores are used, 78 percent of the men in the social service occupational category received their highest interest score on the Technical scale. In fact, the largest number of men in all of the occupational groups obtained their highest interest score on the Technical scale when opposite-sex standard scores were used. Raw score reporting procedures also provided inappropriate results for three of the occupational groups. One of every two men in the social service and business detail criterion groups obtained their highest score on the Technical scale. More than one-third of the men in the business contact area obtained their highest interest code on the Technical scale. In contrast, the largest number of high point codes were in the appropriate category for all six of the occupational groups when reports were based on the same-sex standard scores. Appropriate results were obtained for five of the six categories when combined-sex standard scores were used.

The results for women were similar to those obtained for men. The overall hit rate for the five groups was highest for same-sex norms (45 percent), slightly lower for combined- and opposite-sex standard scores (40

percent), and lowest for raw scores (36 percent). The appropriate high point codes were the most frequent codes in all five occupational groups when scores were based on same-sex norms. When combined-sex and opposite-sex norms were used, the appropriate interest codes were most frequent for three of the five groups, while appropriate codes based on raw scores were most frequent for only one group (social service).

For both men and women, then, the overall hit rates based on same-sex norms were equal or superior to those based on the other reporting procedures. For any given group, a different reporting procedure may produce a maximum hit rate, but across all groups, reports based on same-sex norms generally work the best. A replication of this longitudinal study using a different sample, a different criterion, a slightly shorter time interval and an alternate form of the same interest inventory is described in Study Two.

STUDY TWO

Method

Sample. The sample for the second study consisted of the 3,439 college-bound high school students (2,009 women and 1,430 men) in the ACT Interest Inventory (ACT-IV) national norm group. A detailed description of this sample is provided by Hanson (1974). In the spring of 1975, students were mailed a questionnaire regarding their educational/work status and their satisfaction with various aspects of college life. All questionnaires were mailed to the home address provided by students in 1972 when they completed the ACT-IV. Two hundred ninety questionnaires were returned because of insufficient addresses. Usable responses were returned by 1,825 of the remaining 3,149 students, a 58 percent response rate. Students who were not enrolled in college during the spring semester of 1975 ($N = 382$) were excluded from these analyses.

Responders and nonresponders were compared on the ACT ability test scores and the ACT Interest Inventory (ACT-IV) scales. Both male and female responders were slightly higher in academic ability, as measured by the ACT composite, than the nonresponders (22.2 versus 20.6 for men and 20.7 versus 19.0 for women). However, no significant differences were found for any of the six ACT-IV scales. Hence, there appears to be no systematic bias in the interest inventory results for the obtained sample.

Instrument. The ACT-IV is a 90-item, six-scale interest inventory which measures the six personal orientations described by Holland (1973). Coefficient alpha estimates of reliability range from .88 to .94 for men and .87 to .93 for women. A detailed description of

the technical characteristics in the ACT-IV is provided by Hanson (1974). For a sample of 752 high school seniors in seven schools the correlations between the same-named scales of the ACT-IV and VIP ranged from .87 to .91, with a median value of .90. The level of these correlations indicate that the two instruments measure higher similar constructs.

Analyses. College students in each of 18 educational majors were assigned to one of the six categories used in the first study. The business detail category was excluded from subsequent analyses because the number of men and women was too small. The procedures for comparing results were identical to those employed in the first study. Each individual's highest interest score (high point code) was determined, separately, for raw scores, combined-sex scores and same-sex standard scores. The high point codes based on 1972 ACT-IV results were matched against criterion group membership. A hit was tallied when the high point code and criterion group membership were the same.

Results

The results for the ACT-IV high point code analyses are shown in Table 2. For men, the overall hit rate was nearly identical for the raw scores (42 percent), the combined-sex standard scores (40 percent), and the same-sex standard scores (43 percent). The appropriateness of the interest codes for each major was evaluated as it was in Study One; similar results were found. When same-sex standard scores were used, the appropriate high point interest code was the most frequent code for every educational major criterion group. For example, 52 percent of the 72 men enrolled in science-related college majors obtained their highest same-sex standard score on the Science scale of the ACT-IV. Raw scores worked well for four or five groups. However, social service high point codes were more frequent than creative arts codes for men enrolled in creative arts majors. The combined-sex scores worked less well; inappropriate interest codes (Technical) were suggested to larger proportions of students in the social service and business contact major areas than were the appropriate interest codes.

The results for women, show that the overall hit rate was the same (39 percent) for same-sex and combined-sex standard scores. However, the hit rate for raw scores was substantially lower (33 percent). As for men, the appropriateness of the career suggestions provided to members of each criterion group varied somewhat from one reporting procedure to another. Raw scores, for example, suggested social service careers to 50 percent of the women who eventually entered science majors and to 60 percent of the women who entered creative arts majors. The other two reporting procedures suggested

TABLE 1

Hit Rate Percentages Based on Various Reporting Procedures:
Occupational Criterion Groups (Study 1)

Occupational criterion group	N	Reporting procedure									
		Raw scores		Combined-sex standard scores		Same-sex standard scores		Opposite-sex standard scores			
		M	F	M	F	M	F	M	F	M	F
Science	131	—	16	—	34	—	31	—	17	—	—
Creative arts	47	18	37	44	43	50	51	44	11	56	—
Social service	45	260	20	84	16	70	31	54	7	79	—
Business contact	94	37	25	24	32	27	25	38	18	16	—
Business detail	47	80	21	30	34	53	43	39	9	51	—
Technical	284	29	80	0	70	0	48	45	93	0	—
Unweighted average											
hit rate			33	36	38	40	38	44	26	40	

TABLE 2

Hit Rate Percentages Based on Various Reporting Procedures:
Educational Major Criterion Groups (Study 2)

Educational major criterion group	N	Reporting procedure							
		Raw scores		Combined-sex standard scores		Same-sex standard scores			
		M	F	M	F	M	F	M	F
Science	72	53	68	40	62	51	53	51	—
Creative arts	85	109	26	38	31	64	42	50	—
Social service	128	525	44	73	6	35	28	21	—
Business contact	138	179	30	11	37	33	43	30	—
Technical	126	28	41	4	64	11	48	43	—
Unweighted average									
hit rate			42	33	40	39	43	39	

social service careers to fewer than 20 percent of the women in these two areas.

DISCUSSION

The results of these two longitudinal studies show that reporting procedures based on same-sex standard scores generally provide the highest overall hit rates. The overall hit rate for combined-sex standard scores was nearly as high as the hit rate for same-sex standard scores in both studies. The hit rates for raw scores and opposite-sex standard scores were, typically, somewhat lower. Large numbers of people received their highest scores on only one or two scales, despite their criterion group status. When same-sex norms were used, however, members of each criterion group generally scored higher on the interest scale corresponding to their criterion group than on any other scale. Results were systematically superior to those obtained with other reporting procedures.

Individuals who completed the VIP or ACT-IV as part of the two studies received interest reports based on raw scores and combined-sex standard scores. Hence, the overall hit rates for those two reporting procedures may be somewhat inflated because of the potentially contaminating effects of the interest reports. That is, the interest reports may have influenced the students' educational and vocational plans. The degree of influence cannot be determined, however. If anything, the effectiveness of the reports based on same-sex standard scores is more impressive in light of this aspect of the studies.

A major implication of study results is that the criterion-related validity of different reporting procedures does vary. Study results favor the use of same-sex norms. But since the hit rates and the appropriateness of the career suggestions were similar for same-sex and combined-sex standard scores, counselors may want to examine additional information in deciding between these two reporting procedures. One important consideration is the nature of the career suggestions they provide to men and women. As noted previously, several studies have shown that score reports based on combined-sex norms typically suggest divergent and stereotypic career options to large numbers of men and women whereas reports based on same-sex norms suggest similar career options. Given that the two score reporting procedures have similar levels of criterion-related validity, it seems advantageous to use the one that provides similar career suggestions to men and women.

In any case, one may question the desirability of reporting raw scores or scores based on opposite sex norms. Although recently recommended in Office of

Civil Rights guidelines ("Separate Sex Norms," 1976), scores based on opposite sex norms not only provide highly stereotypic career suggestions to males and females (Prediger, 1976a), they also produce lower levels of criterion-related validity. Results are similar for raw scores.

The implications for the working counselor seem clear. First, when selecting an interest inventory, counselors should determine the nature of the career suggestions provided for representative samples of males and females. To meet the National Institute of Education *Guidelines for Sex-Fairness in Career Interest Inventories* (Diamond, 1975), test publishers are required to provide this type of information. Hence it should be readily available to counselors. If not, counselors are justified in asking publishers to provide the required information. Second, counselors should examine the interest inventory manual for validity evidence supporting the reporting procedure that is used. Data similar to those reported in this study should help counselors evaluate the validity of the reporting procedure. Prediger and Hanson (1974) suggest that sex-restrictive reporting procedures that cannot be justified on the bases of validity evidence may well be sex-biased.

In summary, the results of this study and related studies (e.g., see Prediger and Hanson, 1976, in press; Prediger, 1976b) suggest that interest inventory reporting procedures using same-sex norms provide the most appropriate, valid, and meaningful results for both men and women. Other reporting procedures appear to be less valid, to provide stereotypic career suggestions, or both. These results indicate that counselors should carefully examine the score reporting procedures used by the interest inventories they administer. Because of the widespread use of interest inventories and because of their potential impact on counselees, additional comparisons of reporting procedures are urgently needed.

REFERENCES

- The American College Testing Program. *Handbook for the Career Planning Program* (1972 edition). Iowa City: Author, 1972.
- Berdie, R.F. "Vocational Choice Studies." *Personnel and Guidance Journal* 48(1970): 604-605.
- Cole, N.S. and Hanson, G.R. "Impact of Interest Inventories on Career Choice." Diamond, E., Editor, in *Issues of Sex Bias and Sex-Fairness in Career Interest Measurement*. Washington: National Institute of Education, 1975.
- Gottfredson, G.D. and Holland, J.L. "Vocational Choices of Men and Women: A Comparison of Predictors from the Self-Directed Search." *Journal of Counseling Psychology* 22(1975): 28-34.
- Gottfredson, G.D., Holland, J.L. and Gottfredson, L.S. "The Relation of Vocational Aspirations and Assessments to Employment Reality." *Journal of Vocational Behavior* 7(1975): 135-148.

- Hanson, G.R. *Assessing the Interests of College Youth: Summary of Research and Applications* (ACT Research Report No. 67). Iowa City: The American College Testing Program, 1974.
- Harmon, L.W. "Technical Aspects: Problems of Scale Development, Norms, Item Differences by Sex and the Rate of Change in Occupational Group Characteristics." Diamond, E., Editor, in *Issues of Sex Bias and Sex-Fairness in Career Interest Measurement*. Washington: National Institute of Education, 1975.
- Holland, J.L. *Making Vocational Choices: A Theory of Careers*. Englewood Cliffs, NJ.: Prentice-Hall, 1973.
- Holland, J.L. "The Use and Evaluation of Interest Inventories and Simulations." Diamond, E., Editor, in *Issues of Sex Bias and Sex-Fairness in Career Interest Measurement*. Washington: National Institute of Education, 1975.
- Prediger, D.J. "Contradictory Results Predicted." *APGA Guidepost*, September 9, 1976, p.2.
- Prediger, D.J. "The Viability of Holland's Consistency Construct and Raw Score Assessments of Personality." *Measurement and Evaluation in Guidance* 9(1976): 124-131.
- Prediger, D.J. "Alternatives for Validating Interest Inventories Against Group Membership Criteria," in press.
- Prediger, D.J. and Cole, N.S. "Sex-role Socialization and Employment Realities: Implications for Vocational Interest Measures." *Journal of Vocational Behavior* 7(1975): 239-251.
- Prediger, D.J. and Hanson, G.R. "The Distinction Between Sex-Restrictiveness and Sex Bias in Interest Inventories." *Measurement and Evaluation in Guidance* 7(1974):96-104.
- Prediger, D.J. and Hanson, G.R. "Holland's Theory of Careers Applied to Women and Men: Analysis of Implicit Assumptions." *Journal of Vocational Behavior* 8(1976):167-184.
- Prediger, D.J. and Hanson, G.R. "Some Consequences of Using Raw Score Reports of Vocational Interests." *Journal of Educational Measurement*, in press.
- Rulon, P.J., Tideman, D.V., Tatsuoaka, M.M. and Langmuir, C.R. *Multivariate Statistics for Personnel Classification*. New York: John Wiley, 1967.
- "Separate Sex Norms Usage Must Meet OCR Regulations." *APGA Guidepost*, July, 1976, p. 12.

B. OCCUPATIONAL SCALES

Strong Vocational Interest Blank: One Form or Two? *

by

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Abstract. To study problems in the use of separate forms of the Strong Vocational Interest Blank for males and females, response percentage differences between males and females in 14 occupations were computed for the 229 items common to the two forms of the inventory. On the average, 42% of the common items differentiated men from women in the same occupation. Further analysis indicated that a majority of these differentiating items were not incorporated

into the relevant occupational scales because the items did not differentiate the occupation from a general population. Since the differentiating items that are included on scales potentially can have a noticeable effect on scores, the ultimate goal for the SVIB is one form with scales that do not incorporate sex differences. Intermediate steps to this goal were suggested.

The Strong Vocational Interest Blank (SVIB) is unique among interests tests because it consists of a separate form for each sex. Other popular interest inventories have separate norms, separate scales, and separate profiles for males and females, but the SVIB has separate test booklets containing many items unique to each form of the test. The male form was introduced in 1927, the female form in 1933, and though the inventories have undergone a number of revisions, separate forms, separate scales, and separate profiles for each sex have been retained.

Recently, the SVIB has come under attack by women's liberation groups and has been investigated by the President's Advisory Council on the Status of Women. One question raised by these groups is whether two forms of the SVIB promote discrimination in vocational counseling. One of the tasks of the SVIB is discrimination between members of occupational groups and a general population. However, the SVIB also may promote differential treatment of men and women in counseling.

Having separate forms of the SVIB can be discriminatory in a social sense in two ways. First, occupational scales that are unique to either the male or female form may promote the idea that some occupations require either male or female workers. Thus, occupations whose scales are unique to the male form, such as Veterinarian, Architect, and Forest Service Man, may not even be considered by women taking the female form. Second, occupational scales that appear on both forms may

promote the idea that men and women in the same occupation actually are different in interests and perform different tasks in their occupation, as suggested by Johnson (1970).

This study was addressed to the second of these possibilities, specifically, whether men and women in the same occupation have different interests, whether these differences are reflected in the occupational scales for men and women, and whether these occupational-scale differences are valid and useful.

METHOD

To examine these questions, 14 pairs of recently tested SVIB occupational criterion groups and the in-general samples (men- and-women-in-general) were utilized and are listed in Table 1. A description of the groups is found in Campbell (1971).

Since the sample sizes varied for each group, the response frequencies for 229 items that were identical or similar in the male and female forms of the inventory were converted to percentages. The difference in the response percentages between males and females for each of the groups was calculated for each item. Items that showed a 12 percent or greater difference between males and females within an occupation were identified. Past experience has indicated this percentage to be a practical cutting point. Those items then were investigated to determine if they appeared on either the male or female occupational scales.

The effect, on scales, of items that differentiate between men and women in an occupation is more difficult to assess. Figure 1 presents a paradigm of how item-response differences on the SVIB were analyzed using male and female artists and their relationship to in-general groups as an example. The male scale for

*Reprinted by permission from the *Journal of Counseling Psychology*, 1972, Vol. 19, No. 5, 404-410. The authors are indebted to David P. Campbell, Director of the Center for Interest Measurement Research at the University of Minnesota, for providing the data for this study.

Artists is based only on differences between male artists and men-in-general (Difference a). The female scale for artists is based only on differences between female artists and women-in-general (Difference b). To determine how items that differentiate between men and women in an occupation (Difference c) affect scales, more complex relationships must be considered. Given item-response differences between men and women in an occupation (Difference c), an item can have four possible effects on the male and female scales.

1. Male-female differences are not incorporated in the scale. In spite of a large item-response difference between male and female artists (Difference c), the item appears on both scales because the differences between occupational and in-general groups (Differences a and b) are also large. The sex difference is not differentially incorporated into the scales.
2. Valid male-female differences are incorporated in the scales. The item appears on only one scale because, while item-response differences are large between male and female artists (Difference c), differences are large between the occupational and in-general groups for only one sex (Difference a and b). In these cases, the differences between the in-general groups (Difference d) are small. This was considered a legitimate inclusion of a male-female (M-F) differentiating item on a scale.
3. Nonvalid male-female differences are incorporated in the scales. In spite of an item-response difference between male and female artists (Difference c) and a large difference between men-in-general and women-in-general (Difference d), the item may appear on only one scale because only one of the differences between the occupational and in-general groups (a or b) also is large. This was considered a nonvalid inclusion of an M-F differentiating item on the scale.

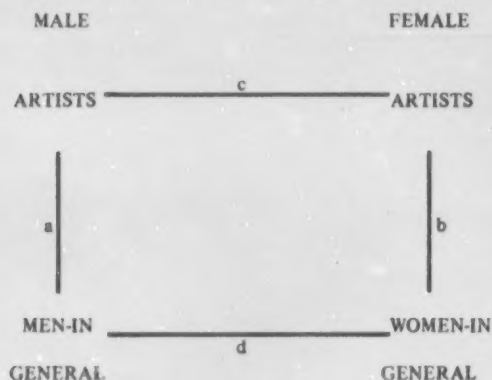


FIG. 1. Paradigm for analyzing sex differences.

4. Nonvalid in-general differences are incorporated in the scales. The item appears on one scale because, while the item does not differentiate between men and women in the occupation (Difference c), it does differentiate between the in-general groups (Difference d) and between one of the occupational and in-general groups (Difference a or b).

RESULTS

Table 1 shows the mean percentage difference between males and females on the 229 items for each occupation as well as the standard deviations. The overall average between the sexes within the occupations and the in-general groups was about 8 percent. This indicates that males and females do have somewhat different base rates or responding to the items on the SVIB. The number of items differentiating between men and women in an occupation by 12 percent or more also is given in Table 1 under the heading Male-Female Differentiating Items, for example, 83 of the 229 (36.2 percent) common items differentiated male artists from female artists by at least 12 percent. The overall average difference, about 40 percent, again indicates a substantial difference in the base rate of responding between males and females.

Although substantial differences appeared in the responses of males and females to the same item, the important consideration was whether or not these differentiating items were incorporated into the Occupational scale structure. Therefore, the items that showed large sex differences were examined to determine if they appeared on either the male or female Occupational scale. For example, Table 2 shows that of the 83 items (from Table 1) that differentiated the male artists from the female artists, 24 of the 83 items (29 percent) appeared on either or both of the male and female artists' scale and 35 of the 102 items (34 percent) that differentiated the in-general groups on one or both of the artists' scales.

Thus, from Table 1, approximately 40 percent of the common items differentiated men and women in the same occupation and the men- and women-in-general groups, and from Table 2, approximately 30 percent of these differentiating items were included in one or both of the Occupational scales. Combining the results from Tables 1 and 2, the data indicated that about 12 percent of the 229 common items differentiated males from females within the same occupation or the in-general groups and also were included on Occupational scales for one or both sexes. Therefore, on the average, no more than 12 percent of the variance of an Occupational scale is composed of sex differentiating items.

TABLE 1
Sex Differences on SVIB Item Responses for Fourteen Occupational Groups
and the In-General Groups

Occupational group	Sample size		M-F percentage difference		M-F differentiating items	
	M	F	M	SD	N	% of common items
Artist	178	297	7.6	6.5	83	36.2
Bank personnel	171	271	10.1	8.9	117	51.0
Chemist	250	173	7.3	6.6	79	34.4
English teacher	223	352	8.7	7.6	102	44.5
Interior decorator	192	172	6.6	5.4	75	32.7
Lawyer	177	235	8.1	7.0	94	41.0
Life insurance sales	250	189	9.5	8.4	122	53.2
Mathematician	223	119	7.1	6.2	81	35.3
Math-science teacher	463	308	9.4	8.3	118	51.5
Medical technologist	252	345	7.6	6.7	89	38.8
Newsman and woman	284	189	8.6	7.4	110	48.0
Physician	240	329	7.6	6.6	92	40.1
Psychologist	252	275	6.8	6.5	70	30.5
Social science teacher	239	183	10.7	9.1	132	57.6
Average	242	246	8.3	7.2	97	42.3
In-general group	1000	1000	8.2	7.0	102	44.5

TABLE 2
Number of Differentiating Items
Between Occupations and
In-General Groups Contained on
Occupational Scales

Occupational group	M-F differentiating items weighted either scale and percentage of M-F differentiating items		Men-women-in-general differentiating items weighted either scale and percentage of 102 in-general differentiating items	
	N	%	N	%
Artist	24	29	35	34
Bank personnel	38	32	27	26
Chemist	19	24	25	24
English teacher	33	32	37	36
Interior decorator	17	23	36	35
Lawyer	25	27	33	32
Life insurance sales	29	24	27	26
Mathematician	25	31	27	26
Math-science teacher	34	29	25	24
Medical technologist	22	25	31	30
Newsman and woman	29	26	32	31
Physician	26	28	29	28
Psychologist	14	20	24	24
Social science teacher	42	32	30	29
Average	27	28	30	29

TABLE 3

The Effect of Differentiating Items that are Contained on Scales

Occupation	Occupational scales						Noninfluential differentiating items		Valid M-F differentiating items				Number of nonvalid differentiating items								
													M-F and in-general differentiating items				In-general only differentiating items				Common items
	M			F			N	M	F	M	F	N	M	F	N	M	F	N	M	F	
	Total	Com-mon	%	Total	Com-mon	%															%
Artist	103	67	65	97	53	55	8	12	15	5	7	6	11	4	1	9	4	13	19	5	9
Bank personnel	85	55	65	72	42	58	12	22	29	7	13	5	12	8	6	2	1	10	18	7	17
Chemist	75	48	64	80	45	56	8	17	18	3	6	3	7	2	3	1	5	3	6	8	18
English teacher	70	50	71	76	52	68	12	24	23	1	2	7	13	5	7	5	1	10	20	8	15
Interior decorator	81	45	56	89	47	53	4	9	9	1	2	6	13	4	2	13	7	17	38	9	19
Lawyer	63	46	73	87	42	48	10	22	24	0	0	6	14	8	1	2	8	10	22	9	21
Life insurance sales	84	54	64	77	45	58	9	17	20	6	11	4	9	6	4	5	2	11	20	6	13
Mathematician	86	52	60	77	42	55	6	12	14	6	12	4	10	5	4	5	2	10	19	6	14
Math-science teacher	62	42	68	82	44	54	8	19	18	6	14	6	14	6	7	1	2	7	17	9	20
Medical technician	64	48	75	73	45	62	10	21	22	6	12	2	4	3	1	7	9	10	21	10	22
News journalist	93	63	68	79	40	51	11	17	28	4	6	3	8	8	3	9	1	17	27	4	10
Physician	75	51	68	68	38	50	7	14	18	4	8	4	10	7	3	5	3	12	24	6	16
Psychologist	81	57	70	77	43	56	4	7	9	1	2	2	5	6	1	5	9	11	19	10	23
Social science teacher	83	58	70	56	31	55	8	14	26	14	24	5	16	10	5	6	1	16	28	6	19
Average	79	53	67	78	44	56		23	20		8		10					21		15	

While Tables 1 and 2 showed that a small portion of the differentiating items actually appeared on the scales, they did not show the effect of these items on the scales. To study this effect, the number of common items on each scale was determined and is reported in Table 3 under the heading Occupational scales. For example, 67 of the 103 (65 percent) items on the male artists' scale were common to both forms of the inventory and the effect of sex differences thus could be investigated on these 67 items.

The analysis of the effect of sex differentiating items followed the paradigm presented in Figure 1 and the results are presented in Table 3.

1. *Noninfluential male-female differences.* If a difference existed between the sexes and if both Occupational scales contained the item because of a large difference between the occupational groups and the in-general groups, this resulted in no sex differences between the scales. Examples of noninfluential sex differences appeared on the Medical Technologists' scales. Males in both the criterion group and in-general groups answered "Like" more often than females to the items "Author of a technical book," "Dentist," and "Electronic Technician." However, female Medical Technologists also responded "Like" more often than the women-in-general sample, and the overall result was the inclusion of these items on both the male and female Medical Technologists' scales. Over all scales, approximately one-fifth (23 percent for males and 20 percent for females) of the common items differentiated males from females and were noninfluential because they were weighted equally on the male and female Occupational scales.

2. *Valid male-female differentiating items.* If male-female (M-F) differences appeared in the occupation but not in the in-general samples, the only M-F differentiating items on scales were those that showed large differences between males and men-in-general, or females and women-in-general at the time of scale development. For example, responses to the items "Computer Operator," "Foreign Correspondent," or "Radio Announcer," for the Medical Technology samples, showed M-F differences but not men- and women-in-general differences. This resulted in the inclusion of the item on only one of the scales, the male Medical Technologists' scale. These items represented legitimate or valid sex differences in interests between males and females in the same occupation. Averaged for all scales, approximately 10 percent of the common items fell in this category.

3. *Nonvalid male-female differentiating items.* Items that differentiated the two in-general groups were regarded as sexually stereotypic. For instance, the items "Artists," "Interior Decorator," "Interpreter,"

and "Secretary" were endorsed by women-in-general more than by men-in-general and were regarded as sexually stereotypic. If these stereotypic items also differentiated males from females in the occupation, then this M-F difference was true of all males and females and not just males and females in the occupation. When such sexually stereotypic item appeared on only one scale, it seemed to be spuriously related to the magnitude of the differences between the occupational and in-general groups, this was considered to be a nonvalid M-F differentiating item. Using the Psychologist samples as an example, the items "Playing the piano," "Art galleries," "Symphony concerts," and "Business methods magazines" showed differences between males and females within the occupations and in-general groups, but appeared on only the male Psychologists' scale. While these items did represent real differences between male and females of the occupation and between males and females in the in-general groups, the items essentially were related to sexual stereotypes that had been included fortuitously in the scale. Fortunately, Table 3 shows only a few items of this type under the column M-F and in-general differentiating items.

4. *Nonvalid in-general differentiating items.* Again, differences between men-in-general and women-in-general were considered sexually stereotypic. If the item showed no differences between males and females within the occupation but was included on one of the scales, another type of invalid sex difference had been introduced into the scales. For example, the items Inventor and Judge appeared on the female Psychologists' scale, but not on the male scale. These two items were weighted on the female scale because women-in-general did not respond "like" very often to these items. However, the male and female psychologists answered "like" to these items at about the same rate. The male and female scales differed, not because people in the occupation differed, but because men-in-general and women-in-general differed.

These last two types of differences, influencing one scale and not the other, did not represent valid differences between men and women in the occupation. The number of items involved and their effect on the scales are shown in the last column in Table 3 under Total nonvalid differences. These nonvalid items comprised 21 percent of the number of common items on the male scales, on the average, and 15 percent of the common items on the female scales.

DISCUSSION

About 42 percent of all items that were common to

the men's and women's forms of the SVIB differentiated men and women in the occupations, and 44 percent of the common items differentiated the men-in-general and women-in-general samples. The percentage varied from 30.5 percent for psychologists to 57.6 percent for social science teachers (Table 1). However, less than 30 percent of the differentiating items for occupational and in-general groups were included on the SVIB scales that were studied (Table 2). This represented roughly 12 percent of the 229 common items.

Although men and women answered SVIB items in different ways, the majority of the differences did not influence scales. Items that showed sex differences but were weighted equally on both scales did not introduce sex differences into the scales. Items that were weighted on only one scale introduced either valid or invalid sex differences into the scales. Analysis showed that, on the average, 9 percent of the common items on the male and female scales reflected valid sex differences within occupations, while 21 percent of the common items for male scales and 15 percent for the female scales represented nonvalid sex differences (Table 3). Apparently, the present system of contrasting occupational groups with in-general groups of the same sex resulted in scales that incorporated more items related to sexual stereotypes than items related to actual valid differences between males and females in the occupation.

A simple solution would be to combine the male and female samples and contrast them with a combined in-general group with both sexes equally represented. This would eliminate sex differences in the resulting scales. However, this procedure would ignore the problem of dozens of Occupational scales on both forms of the SVIB for which only one criterion group is available. For example, too few male secretaries are available to form a criterion group. To contrast a group of female secretaries with a combined male and female in-general group probably would decrease discrimination of the resulting scales. However, combining the occupational groups and the in-general groups also would limit the number of items available for scale construction to 229. The resulting scales would be shorter than the existing scales and probably would be less valid and reliable.

A Word on Using the SVIB

The data suggest that the common items on SVIB scales for males and females in the same occupation

reflect greater similarity in interest than differences between the sexes. However, the development of the two SVIB forms did not control for sexually stereotypic differences between men and women in the same occupation or between men and women-in-general (Differences c and d in Figure 1). Thus, sexually stereotypic items are included in the scales; an individual who is rejecting the traditional role for his or her sex may effect the score on a scale by a substantial amount. For example, if a woman answered all the sexually stereotypic common items ($n = 8$) on the women's English Teacher scale in the nonstereotypic direction she could change her score by six standard score points. If we also assume that a large proportion of the unique items are sexually stereotypic and she rejects them as well, her score could be changed even more drastically. The counselor should be aware of the individual's sex role identification in interpreting SVIB scales.

The case is more clear cut when one considers the individual taking the SVIB form for the opposite sex. In this case sexually stereotyped items, both common and unique, are almost sure to affect the score. For instance, a man scored on the women's Artists scale may score substantially lower than he would on a scale with no stereotypic items simply because he rejects feminine items. Thus, scores obtained from using the SVIB form for the opposite sex are largely uninterpretable. If they are used, they should be interpreted with sexual stereotypes, and their potential effect on scores, in mind.

CONCLUSION

The best way to avoid sexual bias in the SVIB is to design one form of the inventory that controls for sex differences. Unfortunately, since occupational sex differences still exist in the real world, some intermediate steps are necessary. Developing male and female scales based on a totally common item pool and developing one scale for each occupation with both male and female norms would be a beginning. These steps would facilitate the study of sexual differences in vocational interest.

REFERENCES

- Campbell, D. P. *Handbook for the Strong Vocational Interest Blank*. Stanford: Stanford University Press, 1971.
- Johnson, R. W. "The use of interest inventories with women." *University of Wisconsin Counseling Center Reports* 3 (1970), No. 13.

Sex Differences in Vocational Interests: Three Levels of Exploration

By

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Abstract. Data on sex differences in vocational interests are important for developing career interest inventories and for studying changes over time in the world of work. The item level, scale construction level and scale score level of the Strong-Campbell Interest Inventory (SCII) were used to examine the similarities and dissimilarities of vocational interests of women and men in five occupations and of men-in-general and women-in-general. Male-female differences varied

unpredictably from occupation to occupation at all three levels of examination. And, common occupational membership for women and men did not always reduce the differences. Many problems faced today in development of career interest inventories and measurement of vocational interests exist because of sex differences in interests that often are large and usually are unpredictable.

The National Institute of Education's *Guidelines for Assessment of Sex Bias and Sex Fairness in Career Interest Inventories* specify the importance of collecting technical information and data to evaluate the reliability and validity of scale construction techniques (Guideline II, B) and to evaluate the need for updating inventories as occupations change (Guideline II, E). Collecting data on sex differences in vocational interests is critical for determining appropriate procedures to develop sex-fair career interest inventories and is necessary to monitor societal changes in interests.

The complexities of sex differences and vocational interests have concerned test authors throughout the history of interest measurement. E.K. Strong, Jr. (1943) studied the use of one occupational scale for women and men and obtained conflicting results; the procedure worked well for some occupations and not at all for others. Strong's research, which used the Strong Vocational Interest Blank (SVIB), was limited by separate sex test booklets and scales. Because the content of the item pools differed for the two sexes, and because no set of scales had identical items for men and women, it was not possible to do complete comparisons of male-female interest patterns. The Basic Interest Scales, added to the profile in 1969, were ideal for objectively studying general areas of vocational interest. Again, however, scales were constructed independently for the male and the female form of the SVIB. Not only did item content for same-named scales differ, but some scales developed for the women's form were not on the men's form and vice versa.

The Strong-Campbell Interest Inventory (SCII), the 1974 revision of the SVIB, does provide one item pool for males and females as well as General Occupational Theme scales and Basic Interest Scales that are standard-

ized on combined-sex samples. Thus, the SCII is one objective measure of vocational interests that can be used to examine the similarities and dissimilarities of vocational interests of men and women. The remainder of this paper provides an explanation of three levels of exploration that are important for determining future developments in interest measurement: Level 1, or item level; Level 2, or scale construction level, and Level 3, or scale score level.

LEVEL 1: ITEM ANALYSIS

The empirical method of contrasted groups, a statistical design that attempts to insure discrimination of two or more groups (Wiggins, 1973), may be used to compare female and male responses to SCII items.

The strategy of contrasted groups also is used in SCII empirical scale construction to identify items that differentiated criterion and reference samples, in other words, to identify items that differentiate an occupational sample and a general reference sample.

The same procedure may be used to identify items that differentiate two reference samples, such as a general reference sample of men and a general reference sample of women. Or, the procedure may be used to identify items that differentiate two criterion samples, for example, a criterion sample of women in biology and a criterion sample of men in biology.

The following specific procedure was used to test the hypothesis that women and men with common occupational membership have interests that are more similar than the interests of men and women-in-general. For each item, the percentage of two contrast samples that selected the "Like" response alternative was calculated. This was the item response percentage. Then the

percentage difference of the two groups was calculated for each item.

Selecting Occupations for Item Analysis

Although the latest revision of the Strong was published as recently as July, 1974, new occupational samples, destined to replace outdated samples, are being collected and new scales are being developed to further equalize the existing male and female scales presented on the SCII profile. The Center for Interest Measurement Research at the University of Minnesota, a focal point for this research, has accumulated new occupational samples that represent a variety of professions and that include subjects in the age range of 25 to 55 years. The occupations in this study were selected from the recently collected samples.

Tables 1 to 6 compare the "Like" response percents of five different occupations, men-in-general (MIG), and women-in-general (WIG) to six different items. The five occupations are veterinary medicine, life insurance sales, sociology, social work and credit management. The occupations were selected for three reasons. First, they represented traditional and non-traditional vocations. Second, their educational levels included a range from an average of 13 years to an average of 20 years, and third, they were from five of the six Holland types. No occupation could be selected from the Artistic area since SCII data have not been collected at this time for both men and women in the Artistic occupation. Revision plans, however, do include collection of female and male photographers, art teachers, entertainers, and artists.

Women-in-general (WIG) and men-in-general (MIG) samples, used in this study, also are used in the development of empirical Occupational Scales for the SCII (Campbell, 1976). Each sample includes 300 subjects and has a mean age of 35 years and a mean educational level of about two years beyond high school, or 14 years. The subjects for the general reference samples were selected from a variety of occupations that represent all of the Holland types.

Female-male item response comparisons were carried out on all 325 SCII items. Items selected for demonstration purposes met a previously established criterion of a significant WIG and MIG response percent difference. Through the years of SVIB-SCII research, a 16 percent difference between item responses of contrast groups has been determined as essential for the reliability of item selection (Strong, 1943; Campbell, 1977) and items presented in Tables 1 to 6 are representative of SCII items that have at least a 16 percent MIG-WIG difference. For example, chosen items represent a range of response percent differences from a low power item like *Foreigners* (WIG-MIG difference = 18 percent) to the

most powerful item, *Decorating a room with flowers* (WIG-MIG difference = 57 percent). Items also were selected to include three that are endorsed more frequently by WIG than by MIG (*Decorating a room with flowers*, *Sewing*, and *Foreigners*), and three that are endorsed more frequently by MIG than by WIG (*Popular mechanics magazines*, *Governor of a state*, and *Expressing opinions publicly*).

For each item, the actual score for the sample, such as female sociologists or male credit managers, appears in parentheses; the "m" or "f" indicates the sex of the sample; numbers without parentheses are the response percent differences between the males and the females in the occupation. For example, the male-female difference between men and women in social work on the item, *Decorating a room with flowers*, is 54 percent (75 percent - 21 percent). If the number appears between vertical lines as in Column 1, Table 1, the male-female difference meets the criterion of significance, or in other words the difference is 16 percent or greater. If the number is between horizontal lines, the difference is not significant.

Of all the SCII items, *Decorating a room with flowers* in Table 1 had the largest male-female response percent difference for the WIG-MIG samples. Seventy percent of the WIG and 13 percent of the MIG responded "Like" to this item. The differences in response to this item for men and women with common occupational membership also were large. Occupational membership did not decrease the male-female differences to a non-significant level.

The second item, *Sewing*, presented in Table 2, also had a large female-male difference and, like the first item, women in all samples had a higher response rate to the item than did men. Occupational membership did decrease the male-female difference to some extent; however, differences were still statistically significant (16 percent or greater).

Men-in-general had a higher response rate than women-in-general to the item *Popular mechanics magazines*, presented in Table 3. Again, all male-female differences within occupations were significant.

The trend, then, was for male-female differences to remain large when the WIG and MIG difference was extremely large.

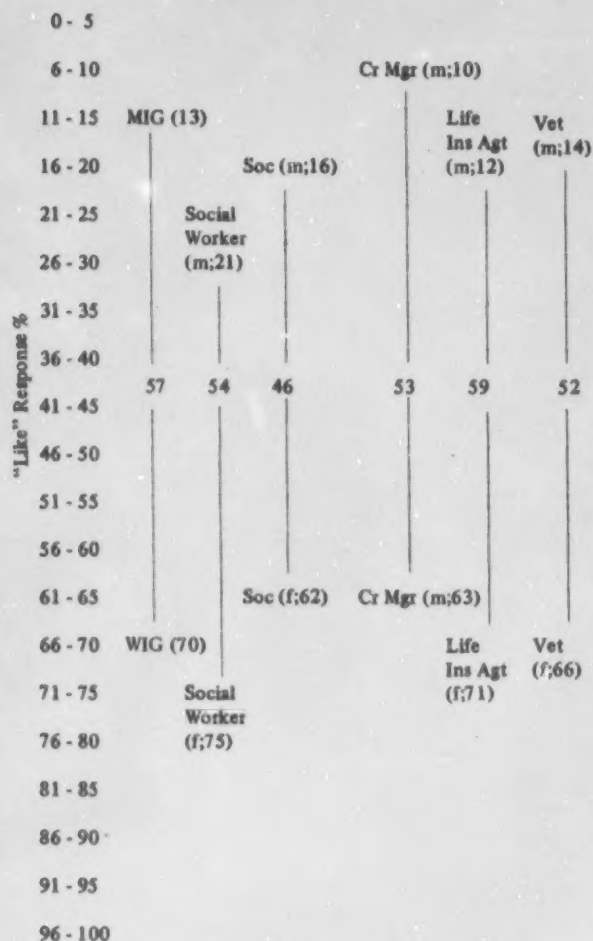
Items in Tables 4 to 6 had WIG and MIG response rate differences that were less extreme. For each of these items, at least one occupational male-female difference was not significant. For the item, *Governor of a state* in Table 4, the difference between MIG and WIG was 21 percent, but the difference between male and female sociologists was only four percent.

The item in Table 5, *Expressing opinions publicly, regardless of what others say* was responded to similarly

TABLE 1

"Like" Response Percents for MIG, WIG, and Men and Women in Five Occupations: Social Work, Sociology, Credit Management, Life Insurance Sales and Veterinary Medicine¹

Item 189: Decorating a room with flowers

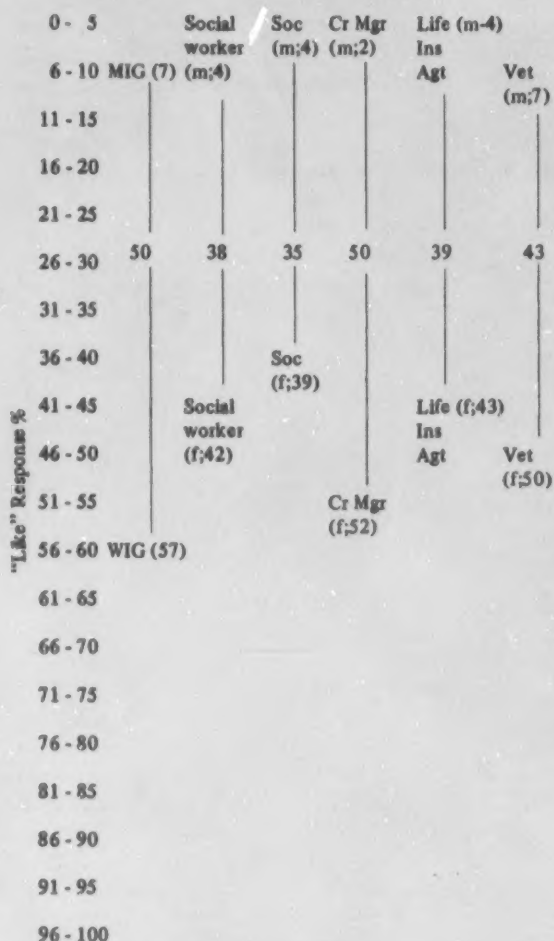


¹Numbers in parentheses are response percents for the sample; numbers without parentheses are male-female response percent differences, e.g. a difference of 57 percent between the 13 percent MIG response rate and the 70 percent WIG response rate.

TABLE 2

"Like" Response Percents for MIG, WIG, and Men and Women in Five Occupations: Social Work, Sociology, Credit Management, Life Insurance Sales, and Veterinary Medicine.¹

Item 185: Sewing



¹Numbers in parentheses are response percents for the sample, numbers without parentheses are male-female response percent differences, e.g. a difference of 50 percent between the 7 percent MIG response rate and the 42 percent WIG response rate.

TABLE 3

"Like" Response Percents for MIG, WIG, and Men and Women in Five Occupations: Social Work, Sociology, Credit Management, Life Insurance Sales, and Veterinary Medicine.¹

Item 244: Popular mechanics magazines

0 - 5					
6 - 10					
11 - 15		Social worker (f;12)	Soc (f;12)	Life (f;14)	
16 - 20	WIG (16)	(f;12)	Cr Mgr (f;19)	Ins Agt	
21 - 25			17		Vet (f;23)
26 - 30			Soc (m;29)	22	
31 - 35	27	33			19
36 - 40				Life (m;36)	
41 - 45		Social worker (m;45)	47	Ins Agt	Vet (m;42)
46 - 50					
51 - 55	MIG (53)				
56 - 60			Cr Mgr (m;56)		
61 - 65					
66 - 70					
71 - 75					
76 - 80					
81 - 85					
86 - 90					
91 - 95					
96 - 100					

¹ Numbers in parentheses are response percents for the sample, numbers without parentheses are male-female response percent differences, e.g. a difference of 37 percent between the 16 percent MIG response rate and the 53 percent WIG response rate.

TABLE 4

"Like" Response Percents for MIG, WIG, and Men and Women in Five Occupations: Social Work, Sociology, Credit Management, Life Insurance Sales, and Veterinary Medicine.¹

Item 58: Governor of a State

0 - 5					
6 - 10					
11 - 15					
16 - 20					Vet (f;17)
21 - 25	WIG (23)		Cr Mgr (f;23)		
26 - 30					18
31 - 35	21	Social Worker (f;31)	22		Vet (m;35)
36 - 40					
41 - 45	WIG (44)	20	Cr Mgr (m;45)		
46 - 50				Life (f;48)	
51 - 55		Social worker (m;51)	Soc (f;54)	Ins Agt	
56 - 60			Soc (m;58)	16	
61 - 65				Life (m;64)	
66 - 70				Ins Agt	
71 - 75					
76 - 80					
81 - 85					
86 - 90					
91 - 95					
96 - 100					

¹ Numbers in parentheses are response percents for the sample, numbers without parentheses are male-female response percent differences, e.g. a difference of 21 percent between the 23 percent MIG response rate and the 44 percent WIG response rate.

TABLE 5

"Like" Response Percents for MIG, WIG, and Men and Women in Five Occupations: Social Work, Sociology, Credit Management, Life Insurance Sales, and Veterinary Medicine.¹

Item 215: Expressing opinions publicly

0 - 5				
6 - 10				
11 - 15				
16 - 20				
21 - 25			Cr Mgr (f;23)	
26 - 30	WIG (3)		16	
31 - 35		Social Worker (f;34)		Vet (f;31)
36 - 40	19		Cr Mgr (m;39)	Vet (m;36)
41 - 45			Life (f;44)	
46 - 50	MIG (49)	17	Ins - 6 -	
51 - 55			Agt (m;50)	
56 - 60		Social Worker (m;51)	Soc (m;53)	
61 - 65			- 7 -	
66 - 70			Soc (f;60)	
71 - 75				
76 - 80				
81 - 85				
86 - 90				
91 - 95				
96 - 100				

¹ Numbers in parentheses are response percents for the sample, numbers without parentheses are male-female response percent differences, e.g. a difference of 19 percent between the 3 percent MIG response rate and the 49 percent WIG response rate.

TABLE 6

"Like" Response Percents for MIG, WIG, and Men and Women in Five Occupations: Social Work, Sociology, Credit Management, Life Insurance Sales, and Veterinary Medicine.¹

Item 262: Foreigners

0 - 5				
6 - 10				
11 - 15				
16 - 20				
21 - 25				
26 - 30				
31 - 35			Cr Mgr (m;37)	Vet (m;38)
36 - 40				
41 - 45			12	
46 - 50	MIG (46)		Soc (m;49)	Cr Mgr (f;49)
51 - 55		18		Life Ins Agt (m;48)
56 - 60			20	-14- Vet (f;56)
61 - 65	WIG (64)			Life Ins Agt (f;62)
66 - 70		Social Worker (m;61)		
71 - 75		Social Worker (f;69)	Soc (f;69)	
76 - 80				
81 - 85				
86 - 90				
91 - 95				
96 - 100				

¹ Numbers in parentheses are response percents for the sample, numbers without parentheses are male-female response percent differences, e.g. a difference of 18 percent between the 46 percent MIG response rate and the 64 percent WIG response rate.

TABLE 7

Differences Between General Occupational Theme Standard Score Means for MIG and WIG, and Men and Women in Five Occupations¹

Scale	Differences					
	MIG-WIG	Vet.	Life Insur. Agent	Sociol.	Social Worker	Credit Mgr.
Realistic	<u>+9</u>	<u>+6</u>	<u>+8</u>	+2	<u>+6</u>	<u>+11</u>
Investigative	<u>+4</u>	-1	0	-2	+1	+ 4
Artistic	<u>-6</u>	<u>-8</u>	<u>-9</u>	-4	-4	- 5
Social	-2	+3	+1	0	+2	+ 1
Enterprising	<u>+4</u>	<u>+4</u>	<u>+2</u>	<u>+3</u>	-1	+ 3
Conventional	0	+2	-1	+2	+1	- 2

¹ Negative numbers indicate that the female sample has higher mean standard scores; positive numbers indicate that the male sample has higher mean standard scores; underlined numbers indicate differences of at least 1/2 s.d. (s.d. = 10).

TABLE 8

Differences Between Basic Interest Scale Standard Score Means for MIG and WIG, and Men and Women in Five Occupations¹

Scale	Differences					
	MIG-WIG	Vet	Life Insur. Agent	Sociol.	Social Worker	Credit Mgr.
Agriculture	+ 3	+ 2	+ 6	+ 2	+ 3	+ 8
Nature	- 3	- 3	- 2	- 4	- 2	+ 2
Adventure	+ 8	+ 6	+ 8	+ 3	+ 8	+10
Military Activities	+ 5	+ 6	+ 8	+ 3	+ 5	+ 7
Mechanical Act.	+ 9	+ 5	+ 6	+ 3	+ 6	+ 9
Science	+ 3	- 1	+ 1	- 2	+ 2	+ 2
Mathematics	+ 3	0	+ 2	- 2	0	+ 2
Medical Science	0	+ 1	+ 2	- 4	+ 2	+ 4
Medical Service	- 5	- 2	- 1	- 2	- 1	- 3
Music/Dramatics	- 8	- 8	-10	- 3	- 6	- 8
Art	- 9	-11	-12	- 6	- 8	- 8
Writing	- 5	- 8	- 8	- 2	- 4	- 6
Teaching	- 4	0	0	+ 1	+ 1	0
Social Service	- 5	+ 1	- 2	+ 1	0	- 1
Athletics	+ 6	+ 9	+12	+ 5	+ 8	+10
Domestic Arts	-15	- 9	-13	- 6	- 9	-13
Religious Activities	- 3	+ 3	0	+ 1	+ 1	- 2
Public Speaking	+ 4	+ 4	+ 1	+ 2	+ 4	+ 3
Law/Politics	+ 5	+ 4	+ 2	+ 2	+ 4	+ 6
Merchandising	+ 1	+ 2	- 1	+ 1	- 3	0
Sales	+ 5	+ 5	+ 2	+ 4	0	+ 3
Business Management	+ 4	+ 6	+ 2	+ 2	+ 2	+ 2
Office Practices	- 6	- 1	- 5	+ 2	- 3	- 9

¹ Negative numbers indicate that the female sample has higher mean standard score; positive numbers indicate that the male sample has higher mean standard score; italicized numbers indicate differences of at least 1/2 s.d. (s.d. = 10).

by men and women in veterinary medicine, sociology and life insurance sales; however, men and women in social work and credit management responded differently at a significant level.

For the item *Foreigners* in Table 6, the opposite was true. The male-female difference for social workers and credit managers was not significant, but the difference for sociologist, life insurance agents and veterinarians was.

As WIG and MIG response rate differences decreased, occupational membership was more likely to influence male-female difference. However, even though occupational membership reduced the male-female differences, they did not disappear entirely, and a decrease in differences was not predictable from one occupation to the next.

LEVEL 2: ITEM SELECTION FOR EMPIRICAL SCALE CONSTRUCTION

The traditional method for developingSCII Occupational Scales involves collecting item response data from criterion group members, all of the same sex and occupation, and comparing their responses with item responses of a general reference sample of the same sex. Items that differentiate the criterion sample from the reference sample at a 16 percent or greater response percent difference are identified for inclusion in the scale. Scales are developed for women based on a comparison of female criterion samples to female reference samples, and scales for men are based on a comparison of male criterion samples to male reference samples because recent research indicated that the separate-sex method still is the most valid and reliable technique (Hansen, 1976; Campbell, 1977).

The hypothesis that male-female differences decrease with common occupational membership may be studied at the scale construction and item selection level. If female and male response differences examined at Level 1, the item level, are occupationally relevant, then the item content of independently constructed male and female occupational scales should be very similar.

Harmon and Johansson (1972) have suggested, however, that sex differentiating items are not occupationally relevant and should be eliminated from Occupational Scale construction. If only non-differentiating, or occupationally relevant, items are used, item overlap for male and female scales developed for the same occupation should be identical.

Traditional and modified scales were constructed for the five occupations under consideration. Item overlap between male and female occupational scales was not extensive for either the traditional or the modified method. The traditional male and female Sociologist

scales had 27 percent of their items in common. About 30 percent of the items on the Veterinarian scales and 30 percent of the items on the Credit Manager scales overlapped. Twenty-seven percent of the items on the male and female Social Worker scales were identical, and 51 percent of the items on the male and female Life Insurance Agents scales were the same.

Most overlaps increased, but did not reach complete symmetry, in the modified method which deleted items that differentiated WIG and MIG at a 16 percent or greater response percent difference. Male-female item overlaps were 41 percent for the Sociologist scales, 46 percent for the Veterinarian scales, 43 percent for the Credit Manager scales and 39 percent for the Social Worker scales. Item overlaps remained the same for the male and female Life Insurance Agent scales, that is 51 percent.

Incompatibility in item content of male and female scales constructed for the same occupation suggest that care and caution are warranted before plunging into combined-sex scale construction that would ignore male-female differences (Hansen, 1976).

LEVEL 3: SCALE SCORES

The third level at which male and female differences can be studied is at the scale score level usingSCII General Occupational Theme scales and Basic Interest Scales. Both sets of scales have identical item content for men and women and are standardized using a linear transformation with the men for a combined-sex sample of men and women (the previously described MIG and WIG) set equal to 50 with a standard deviation of 10. The WIG, MIG and five occupational samples were scored on the GOT and BIS, and male-female differences were calculated.

General Occupational Theme Scales (GOT)

The General Occupational Theme Scales (GOT) were developed by selectingSCII items that reflect Holland's definition of occupational types (Campbell and Holland, 1972; Hansen and Johansson, 1972). (For complete interpretive definitions of the GOT, see Campbell, 1974).

Table 7 is a summary of the differences on the GOT, between MIG and WIG and between men and women with common occupational membership. All differences of one half of a standard deviation (5 points) or more are underlined. Negative differences indicate that the female sample scored higher than the male sample did on that scale, for example, WIG scored higher on the Artistic scale than did MIG, and positive differences indicate that the male sample scored higher than did the female sample.

Differences between men and women with common occupational membership varied, for example, interests of male and female sociologists were more similar than were interests of males and females in other occupations. But, generally, occupational membership reduced the number of large male-female differences.

The Realistic and Artistic themes, however, consistently had male-female differences of at least one half a standard deviation. Occasionally, female-male differences within occupations actually were inverted compared to MIG and WIG differences. For example, WIG scored slightly higher on the Social Theme than did MIG, however, male veterinarians scored higher than did female veterinarians on this scale.

Basic Interest Scales (BIS)

The Basic Interest Scales (BIS) were constructed using cluster analysis based on intercorrelations of SCII items (Campbell, Borgen, Eastes, Johansson and Peterson, 1968). Scale names reflect scale item content, and BIS scores provide specific information on areas of similarity and dissimilarity of male and female vocational interests.

Thirteen of the 23 BIS, presented in Table 8, had differences of at least five points (one half of a standard deviation) between MIG and WIG. Art, Athletics, and Domestic Arts differentiated men and women in all occupations. Similar to the GOT results, men and women with common occupational membership had slightly fewer large differences on the BIS than did MIG and WIG, and male and female sociologists looked the most similar.

CONCLUSIONS:

Recently collected data reflect E.K. Strong, Jr.'s 1943 findings that WIG and MIG, as well as men and women with common occupational membership, have vocational interest differences. Evidence from three levels of interest measurement—the item analysis level, the empirical scale construction level, and the GOT and BIS scale score level—indicated that male-female differences vary unpredictably from occupation to occupation. To generalize from conclusions about one occupation to conclusions about the entire world of work is dangerous. However, it is safe to say that sex differences

in vocational interests create problems for interest inventory item development (Holland and Gottfredson, 1976), scale construction (Hansen, 1976), norming and standardization (Prediger, 1976; Holland, 1976) and scale interpretation (Campbell, 1974).

The three levels of exploration that were examined provide a method for continued research of the differences. Further study, explained to other occupations and extending into the future, should provide a clearer understanding of the differences, suggest techniques for improving current measurement methods and determine the need for updating career inventories.

REFERENCES

- Campbell, D.P. *Manual for the Strong Vocational Interest Blank: Form T325 (SCII)*. Stanford: Stanford University Press, 1974.
- Campbell, D.P. *The Manual for the SVIB-SCII*. Stanford: Stanford University Press, 1977.
- Campbell, D.P., Borgen, F.H., Eastes, S.H., Johansson, C.B., and Peterson, R.A. "A Set of Basic Interest Scales for the Strong Vocational Interest Blank for Men." *Journal of Applied Psychology Monographs* 52 (6) (1968), (Whole No. 2).
- Campbell, D.P. and Holland, J.L. "A Merger in Vocational Interest Research: Applying Holland's Theory to Strong's Data." *Journal of Vocational Behavior* 2 (4) (1972): 353-376.
- Hansen, J.C. "Exploring New Directions for Strong-Campbell Interest Inventory Occupational Scale Construction." *Journal of Vocational Behavior* 9 (2) (1976): 147-160.
- Hansen, J.C. and Johansson, C.B. "The Application of Holland's Vocational Model to the Strong Vocational Interest Blank for Women." *Journal of Vocational Behavior* 2 (4) (1972): 479-493.
- Holland, J.L. "Consistency and Raw Scores Survive Another Test: A Last Response to Prediger and His Colleagues." *Measurement and Evaluation in Guidance* 9 (3) (1976): 132-135.
- Holland, J.L. *Making Vocational Choices: A Theory of Careers*. Englewood Cliffs, New Jersey: Prentice-Hall, 1973.
- Holland, J.L. and Gottfredson, G.D. "Sex Differences, Item Revisions, Validity and the Self-Directed Search." *Measurement and Evaluation in Guidance* 8 (4) (1976): 224-228.
- Johansson, C.B. and Harmon, L.W. "Strong Vocational Interest Blank: One Form or Two?" *Journal of Counseling Psychology* 19(1972): 404-410.
- Prediger, D.J. "The Viability of Holland's Consistency Construct and Raw Score Assessments of Personality." *Measurement and Evaluation in Guidance* 9 (3) (1976): 124-131.
- Strong, E.K., Jr. *Vocational Interests of Men and Women*. Stanford: Stanford University Press, 1943.
- Wiggins, J.S. *Personality Prediction: Principles of Personality Assessment*. Reading, Massachusetts: Addison-Wesley, 1973.

The Reliability and Concurrent Validity of Three Types of Occupational Scales for Two Occupational Groups: Some Evidence Bearing on Handling Sex Differences in Interest Scale Construction*

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Abstract. The newSCII continues to provide occupational scales developed for one sex by comparing members of an occupation and an in-general group of the same sex. This study examined the effects of developing three types of scales, single sex, combined sex and combined sex with items which differentiate between the sexes eliminated, for

Veterinarians and Life Insurance Agents. Reliability was acceptable for all scales. The concurrent validity of combined sex scales was greatest when women's scores were examined, but the concurrent validity of single sex scales was greatest when men's scores were examined.

Occupational scales on the Strong-Campbell interest Inventory (SCII) and its predecessor, the Strong Vocational Interest Inventory (SVIB), were constructed by comparing the percentage of criterion groups of men or women employed in a specific occupations who responded "like," "indifferent" or "dislike" to specific items with the percentage for a general group of employed people of the same sex (Campbell, 1966, 1969, 1974). If the two groups responded quite differently to a specific item, it was included on the scale for the occupation of the criterion group. Both the SVIB and the SCII employed separate sex criterion groups and separate sex in-general groups in scale building. Thus, there are a number of occupations, such as dietitian, veterinarian, army officer, engineer, dentist, physician, college professor, artist, librarian, social worker, lawyer, accountant and banker, which are represented by two scales on the SCII, one for each sex. Scores are reported for both male and female scales to any individual. Since the male and female scales are different they can result in different scores which may be confusing and difficult to interpret.

The SCII which was introduced in 1974 differs from the SVIB in that it utilizes the same item pool for men and for women. The General Occupational Theme

Scales, based on Holland's typology (1973), and the Basic Interest Scales use the same items for men and women. However, the Occupational Scales were constructed separately for each sex and do not necessarily use the same items for each sex. In the SCII manual, Campbell (1974) demonstrated that there are sex differences in item response and suggested four ways to handle them in constructing occupational scales. He chose the same method which had been used in the Strong Vocational Interest Blank (SVIB) since the early thirties. This method is the one described above.

The approaches Campbell (1974) rejected were:

1. Combining both sexes in one criterion group without reference to the number of each sex included,
2. combining both sexes in one criterion group so that equal numbers of each sex were represented,
3. making separate scales for each sex and equating them by applying a constant determined by the respondent's sex.

There were a number of practical reasons why a change in occupational scale construction was not feasible on the SCII, not the least of which was the fact that many of the existing criterion groups had only responded to that portion of the SCII items which were on the SVIB for their sexes. In addition, there was little evidence that any new method was as reliable and valid as the old method.

This paper represents an attempt to compare empirically the reliability and concurrent validity of three

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types of occupational scales. The first type will be called *single-sex scales* since they were constructed by comparing criterion occupation members of only one sex with an in-general sample of the same sex. This is the method used to construct occupational scales on the SVIB and theSCII. Men-and Women-in-General and men and women within the same occupation do respond differently to many items and this has been one reason given for constructing separate scales. Further support for separate scales is found in research done by Hansen (in press) describing the content of individual items according to Holland's personality theory. Her data suggest that men and women in the same occupations respond differently not only in a quantitative sense related to level of interest, but also on a qualitative basis related to the structure of interests. This is an entirely new area of research and could be important in explaining why combined scales would not be possible for all occupational groups.

The second type of scale will be called *combined sex scales*. They were constructed by comparing the combined item responses of men and women within the same occupation to the combined responses of Men-and Women-in-General, with each sex equally weighted. The philosophy of combining male and female samples to construct one scoring scale does not deny that men and women respond differently to items, but rather questions the importance of these differences for discriminating between the normative sample and other occupational samples. This approach is analogous to the second method noted by Campbell.

The construction of the third type of occupational scale called *combined sex minus MF scales* involved a departure from the empirical procedure established by Strong. For this third type of scale, items which differentiated between Men- and Women-in-General (MF items) were eliminated from the combined scale described above. The suggestion was made at the 1974 National Institute of Education conference on Sex Bias and Sex-Fairness In Career Interest Inventories that eliminating items men and women respond to differently after the usual empirical procedure of scale construction was completed might reduce sex bias. Johansson and Harmon suggested a more sophisticated version of the same idea in a 1972 article. They drew a distinction between valid and non-valid male-female differentiating items. An item showing a male-female difference in the occupational samples, but not in the in-general samples was considered a legitimate sex difference in interest between males and females in that occupation. Items differentiating not only males and females within the same occupation, but also Women- and Men-in-General are non-valid differentiating items for a specific occupation, as are items differentiating only the in-general

groups and not males and females within the same occupation. Removing MF items after the selection of scale items by the usual procedure has the effect of removing non-valid differentiating items (as defined by Johansson & Harmon) from the combined sex minus MF scales.

This study may help determine whether these methods are feasible alternatives to the traditional method, which presents some problems in interpretation, as noted by the Association for Measurement and Evaluation in Guidance Commission on Sex Bias in Measurement (1973), Johansson and Harmon, (1972) and Harmon (1975). However, this study was undertaken with full realization that no broad generalization could be made from an initial study utilizing only two occupations.

METHOD

A look at the description of the Occupational Criterion Groups, Appendix C, of the SCII manual (Campbell, 1974, p. 92-98) shows that attempts were made to collect several new criterion groups in 1973 utilizing the research form of the SCII. Furthermore, an attempt was apparently made to collect data which reflects that men and women do enter all kinds of occupations. Thus, female advertising executives and credit managers, male dietitians and nurses were studied. In these cases, a criterion group for the opposite sex had been collected previously using earlier forms of the inventory. New groups of both males and females were studied for only two occupations, veterinarians and life insurance agents. Since these were the only criterion groups on which both males and females completed the SCII they were chosen for this study. The groups are described in the SCII manual (Campbell, 1974).

Using these two occupational groups, three types of scales were formed for each occupation, one scale for each sex compared with a same sex reference group (single sex scales), one scale for the combined group compared with a reference group containing an equal number of males and females (combined sex scales) and one scale for the combined group compared with the combined reference group with items which differentiate men and women in the reference group deleted (combined sex minus MF scales). A total of four scales for each occupation resulted. The reference groups used, Men-in-General (MIG), Women-in-General (WIG) and the General Reference Sample (GRS) were used in constructing the SCII and are described in its manual (Campbell, 1974).

For the combined scales it was necessary to equate the influence of male and female respondents. Practical details of data collection and economics dictated that

this be achieved in different ways for the Veterinarian and Life Insurance combined scales. For the Veterinarian scales the female veterinarian sample was reduced to equal the size of the male sample; only the first 204 acceptable SCII's returned by women were used in constructing these scales. Since the number of female and male life insurance agents were so similar the female-male influence on item selection and calculation of percent overlap was achieved by a statistical weighting of the two groups. For the third type of scale, the criterion used for deleting items which differentiate males and females in the GRS, called MF items, was whether the item responses of males and females differed by 15 percent or more.

When constructing scales, the choice of a minimal percent difference in response rates between the normative group and a general group has an important effect on the concurrent validity of scales as discussed by Abrahams (1967). Three veterinarian scales were constructed holding the minimal percent difference required for item membership on a scales constant at 21 percent. This percentage was chosen to give a minimum scale length of about 40 items while maximizing item validity. Because of the difference in resulting scale lengths, a lower percent difference was tried for the shorter scales. Since this effort did not result in better scales (although it did result in longer scales) the results are not reported here. The characteristics of the scales can be found in Table 1.

The first scale listed, Female Veterinarians-21 percent (FVET-21), was based on the comparison of women veterinarians to WIG and includes 67 items. The second scale, Male Veterinarians-21 percent (MVET-21), was based on male veterinarians compared to MIG and contains 40 items. Combined Veterinarians-21 percent (CVET-21), the third scale, was based on the comparison of male and female veterinarians combined to the GRS and has 39 items. The Combined Veterinarians-MF scale (CVET-MF) was based on a minimal percent difference of only 17. A lower percent difference was necessary to meet the criteria of approximately 40 items.

The concurrent validity of a scale, the extent to which it distinguishes between groups, has traditionally been evaluated by Tilton's percent overlap statistic (1937). The statistic is calculated on two distributions, each representing how people in different occupational groups scored on the same scale. The two distributions can overlap from zero to 100 percent, depending on what percentage of the people in one group received scores in the same range as people in the second group. The lower the percent overlap, the better the scale discriminates members of the two occupations and, theoretically, the fewer people from each group will be

misclassified. A zero percent overlap means the two distributions are entirely separate, the ideal situation, while a 100 percent overlap shows a failure of the scale to discriminate at all between the two groups. In Table 1, the last three columns show the overlap between a given criterion sample and Women-in-General, Men-in-General and the General Reference Sample respectively. The median overlap for SCII scales at 36 percent with a range of 17 to 58 percent (Campbell, 1974).

To summarize, FVET-21 and MVET-21 represent the single-sex type of scale. They were constructed independently by comparing veterinarian and an in-general sample of the same sex. CVET-21 represents the combined type of scale since it was constructed by comparing a combined normative group with a combined general reference sample. The CVET-MF scale represents the third type of scale. It was constructed by eliminating all MF items, for this study defined as items with a 15 percent or greater difference in the response rates of Men- and Women-in-General, from the longer combined veterinarian scale. CVET-MF includes 46 items.

The same three types of scales, single-sex combined and combined minus MF items, were constructed for the life insurance sample and are listed in Table 1. The single-sex male and female insurance agents scales, MLIF-23 and FLIF-22, have the same number of items, 65, and very similar minimal percent difference necessary for item selection. The combined scale, CLIF-22, is very similar to the single-sex scales regarding these two scales characteristics. CLIF-MF, the third type of scale, is the result of removing all MF items from the CLIF scale. There are 35 items on this last scale and a 22 percent minimum difference was used in selecting items.

Since it is important to establish that all these scales are reliable, test retest reliabilities were computed using the Whitten sample described by Campbell (1974) which has an average test retest interval of 14 days on 74 males and 106 females whose mean age was 18.7 years with an age range of 17-55 years. The reliabilities are shown in Table 1.

The decision to use one type of scale over the other must rest on the extent to which the different scales distinguish people-in-general from members of the normative occupation, as well as separating members of other occupational groups from the normative sample. Therefore, Tilton's overlap was computed between each sex in each of the two occupations and 8 to 10 groups of the same sex using each of the three types of scales to obtain scores. The results are in Table 2. The comparison groups included the appropriate in-general group, members of married couples, ninth graders, and members of other occupations. Unfortunately, the available occupa-

tional groups for comparison differed for men and women. However, the occupational samples included in Table 2 are all those collected on theSCII at the time of

this study. Including other samples would have meant comparing percent overlaps between groups which had not all answered the same set of items.

TABLE 1
Scale Listings, Reliabilities, and Percent Overlaps for Veterinarian and Life Insurance Scales

Criterion sample	N	Identity Code	Comparison ^a Group	Percent Difference	No. of Items	Reliability	Percent overlap with:		
							WIG	MIG	GRS
Female Veterinarians	204	FVET-21	WIG	21	67	.94	26	42	33
Male Veterinarians	204	MVET-21	MIG	21	40	.89	25	22	23
F&M Veterinarians	408	CVET-21	GRS	21	39	.91	23	24	24
F&M Veterinarians	408	CVET-MF	GRS	17	46	.91	27	23	25
Female Life Insurance	214	FLIF-23	WIG	23	65	.91	23	39	31
Male Life Insurance	264	MLIF-22	MIG	22	65	.81	15	30	23
F&M Life Insurance	b	CLIF-22	GRS	22	62	.90	18	37	27
F&M Life Insurance	b	CLIF-MF	GRS	22	35	.88	25	36	30

a. WIG = Women-in-General, MIG = Men-in-General, GRS = General-reference sample.

b. The 214 females and 264 males were statistically weighted to make the influence of females and males equal (see text).

TABLE 2
Percent Overlap for 3 Types of Veterinarian and Life Insurance Scales

Female Groups	N	Female Veterinarians (N=204) Scales			Female Life Insurance Sellers (N=214) Scales		
		FVET-21	CVET-21	CVET-MF	FLIF-23	CLIF-22	CLIF-MF
Women-in-General (1973)	300	26	21 ^b	23	23	22 ^b	26
Couples Sample	73	29	24 ^b	30	14	12 ^b	17
9th Graders	108	22	15 ^b	23	12 ^b	14	16
Life Insurance Sellers/ Veterinarians ^a		18	14	9 ^b	11 ^c	12	11 ^c
Civil Servants	112	16	13 ^b	15	18	17 ^b	22
Advertisers	215	29	15	13 ^b	44	41 ^b	46
College Professors	400	47	39	33 ^b	17	16 ^b	19
Credit Managers	151	10	7 ^c	7 ^c	47 ^c	47 ^c	54
Optometrists	122	46	36 ^b	37	26 ^b	28	28
Physicians	321	67	37 ^b	41	9	8	6 ^b
Medians		275	18.5 ^b	23	17.5	16.5	20.5
Males Groups	N	Male Veterinarians (N=204) Scales			Male Life Insurance Sellers (N=264) Scales		
		MVET-21	CVET-21	CVET-MF	MLIF-23	CLIF-22	CLIF-MF
Men-in-General (1973)	300	22 ^b	27	27	30 ^b	33	35
Couples Sample	73	33 ^b	37	40	22 ^b	25	23
9th Graders	91	27 ^b	31	37	13	15	13 ^b
Life Insurance Sellers/ Veterinarians ^a		18	24	15 ^b	19	19	17 ^b
Civil Servants	184	27 ^b	29	33	20 ^c	20 ^c	22
Dietitians	327	34	32 ^b	34	34 ^b	36	41
Nurses L.P.N.	100	44	38 ^b	44	20 ^b	21	26
Speech Pathologists	336	24 ^b	26	33	21 ^b	25	30
Medians		27 ^b	30	33.5	20.5 ^b	22.5	24.5

a) The Veterinarians are compared with Life Insurance Sellers and vice versa.

b) Indicates the lowest overlap of the 3 scales for the group indicated.

c) Indicates a tie for the lowest overlap of the 3 scales for the group indicated.

RESULTS AND DISCUSSION

The effectiveness of the various scales for differentiating the veterinarians and the insurance agents from other occupations are recorded in Table 2 in the form of Tilton's percent overlap statistic. In each row of each section the lowest percent overlap, and therefore the best discrimination between the normative sample and the comparison group, is noted.

The data are grouped according to whether the men veterinarians, women veterinarians, men insurance agents or women insurance agents are being compared with the other groups. The important issue is whether a combined scale can distinguish between the normative group members and member of other occupational groups of the same sex, as effectively as a scale based only on one sex. In general, the level of percent overlap between any two of these groups will vary with their interest similarity. For instance, Female Veterinarians overlap with female optometrists by 36-46 percent when scored on the various veterinarian scales but they overlap with female civil servants by 13-16 percent when scored on the same scales. This indicates greater similarity between female veterinarians and optometrists than between female veterinarians and civil servants. However, the differences between each set of three overlaps for the same two groups can be attributed to the differential effectiveness of the scales.

For example, the first set of data in Table 2 labeled "Female Veterinarians" compares women veterinarians to the comparison groups listed on the left side. The column headed "FVET-21" means that the women veterinarians and the comparison group were both scored on the women's veterinarian scale, FVET-21. The first number in this column indicates there is a 26 percent overlap in scores of women veterinarians and Women-in-General when they are both scored on FVET-21.

The second column, labeled "CVET-21," indicates both the women veterinarians and the comparison sample were scored on the combined scale, CVET-21. There is a 21 percent overlap between female veterinarians and Women-in-General scored on this scale. The superscript following the 21 points out that the combined scale provides the best discrimination of Women-in-General and women veterinarians of the three scales being compared.

The third column is labeled "CVET-MF." Percent overlaps in the column are based on scoring the female veterinarians and comparison groups on the scale CVET-MF.

At the end of the list of comparison groups, the median percent overlap for each type of scale is reported. Not only does the combined scale, CVET-21,

result in the lowest median percent overlap of the three scales (18.5 percent), but it results in better discrimination than the single-sex scale between veterinarians and the comparison group for every sample listed. The range of the decrease in overlap obtained by using the combined scale rather than the single-sex scale is from 3 to 30 points with a mean of 8.9. The jump from 67 percent overlap between physicians and veterinarians on the single-sex scale down to 37 percent on the combined scale is dramatic. The improvement in discriminating women veterinarians from women advertisers, optometrists and college professors is clearly important.

Both the consistency of improve discrimination with the combined scale over the single-sex scale and the size of the improvement clearly indicate the combined scale has greater concurrent validity as measured by Tilton's statistic, with this sample of comparison groups that the single-sex scale.

The evidence is weaker and points in the opposite direction when considering the relative concurrent validity of single and combined scales for male veterinarians and a sample of male comparison groups. For these groups the difference in percent overlap between the first two types of scales varies only from 2 to 6 points with a mean of 3.9. This restricted range is reflected in the 3 point difference, in favor of the single-sex scale, in the median percent overlap values.

In five out of eight cases the single-sex scale results in better discrimination between male veterinarians and the comparison group than either form of combined scale. So, while the combined scale improves over the single-sex scale in discriminating of women veterinarians from women in other occupations, the single-sex type of scale is slightly better in discriminating male veterinarians from males in other occupations. As is usual in psychology, the data do not lead to simple decisions.

The combined sex scale minus MF items does not result in any improvement over the combined sex scale in concurrent validity for either male or female veterinarians.

A comparison of the life insurance data with results from the veterinarian scales shows how important it is to avoid generalizing beyond these data. Although the same pattern in percent overlaps is found, the combined scale being better at discriminating female occupations and the single-sex scale being slightly better for male occupations, the magnitude of the difference is much reduced. The average difference between percent overlaps for combined versus single-sex insurance agents scales are so small, 1.5 for women and 1.6 for men, that there is no discriminative advantage to be gained by the use of one type of scale over the other. As with the veterinarian data, the combined scale minus MF items does not contribute to occupational discrimination.

The reason for the difference in results for veterinarians and insurance agents can not be discerned until more occupations have been studied. However, an examination of item content of the scales suggests some possible leads. There is a large item overlap between the separate male and female scales for both occupations. Many of the common items on the insurance agent scales are typed as masculine, i.e., they differentiate between MIG and WIG. A difference between the female veterinarian scale and the female insurance agent scale is the presence on the former of a large number of negatively weighted items unique to the women's veterinarian scale that are empirically typed as feminine. While male veterinarians are actually similar to female veterinarians in their rejection of these items, they appear only on the women's scale as an artifact of the empirical method of construction. This is a good example of what Johansson and Harmon meant by non-valid MF items. These items are lost when the combined scale is constructed. There is no comparable set of unique masculine or feminine items on the insurance agent scales to lose when switching to a combined scale.

Further research must be done before any decision concerning the relative validity of combined and single sex scales can be made. First, we have looked at only two occupations and there is a chance the relative advantage of the two types of scales will vary slightly with every new occupation examined. Second, both veterinary medicine and insurance sales have traditionally been male-dominated vocational areas and occupations dominated by women should be studied. Finally,

this paper has focused on concurrent validity and has not dealt with predictive validity, a very important attribute of any interest scale.

REFERENCES

- Abrahams, N.M. "SVIB Key Length: Dissident Data." *Journal of Applied Psychology* 51 (1967): 266-273.
- Association for Measurement and Evaluation in Guidance Commission on Sex Bias in Measurement. "AMEG Commission Report on Sex Bias in Interest Measurement." *Measurement and Evaluation in Guidance* 6 (1973): 171-177.
- Campbell, D.P. *Manual for the Strong Campbell Interest Inventory*. Stanford: Stanford University Press, 1974.
- Campbell, D.P. *Strong Vocational Interest Blanks Manual* (revised from E.K. Strong, Jr.). Stanford: Stanford University Press, 1966.
- Campbell, D.B. *1969 Supplement to the SVIB Manual*. Stanford: Stanford University Press, 1969.
- Hansen, J.C. "Coding SBIV items according to Holland's Theory of Personality Types." *Measurement and Evaluation in Guidance*, in press.
- Harmon, L.W. "Technical Aspects of Scale Development, Norms, Item Differences by Sex, and the Rate of Change in Occupational Group Characteristics." *Sex Bias and Sex Fairness in Career Interest Inventories*, edited by E. Diamond. Washington: National Institute of Education, 1975.
- Holland, J.L. *Making Vocational Choices: A Theory of Careers*. Englewood Cliffs, N.J.: Prentice-Hall, 1973.
- Johansson, C.B. and Harmon, L.W. "Strong Vocational Interest Blank: One Form or Two?" *Journal of Counseling Psychology*, 19 (1972): 404-410.
- Tilton, J.W. "Measurement of Overlapping." *Journal of Educational Psychology*, 28 (1937): 656-662.

Validity Generalization of the Men's Form of the Strong Vocational Interest Blank with Academically Able Women*

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Abstract. The men's form of the Strong Vocational Interest Blank, SVIB-M, was used to study the validity of a single inventory for predicting career choices and college majors at the end of college from precollege interests of high ability men and women. Groups consisted of 570 women and 1,031 men in 16 major fields and 452 women and 780 men in 10 career fields. All study participants were National Merit Scholars in 1966. Differentiations of career and major field groups obtained from the SVIB-M Occupational scales were compared for men

and women. Multiple discriminant function weights were obtained for two-thirds of the sample of men and were cross-validated on the remainder of the men and all of the women. Although plots of subgroup centroids in discriminant space revealed some systematic sex differences, the results, in general, suggest that a single form of the Strong Vocational Interest Blank is potentially feasible for predicting college major and career choices of women as well as men.

The use of separate forms of the Strong Vocational Interest Blank (SVIB) for men and women has been indicted as a discriminatory barrier to equal opportunity for women and for fostering sexual stereotypes (e.g., Schlossberg, 1972; Tittle, 1974). Amid these cultural pressures, vigorous efforts were launched to produce a unisex version of the SVIB which would be both socially and psychometrically satisfactory.

The SVIB revision which has emerged, the Strong-Campbell Interest Inventory (SCII; Campbell, 1974), uses a common test booklet but retains separate sex norms. Individuals are scored on all Occupational scales, whether derived on women or on men. For many occupations, one's responses can now be compared with responses from both sexes, for example, with both female mathematicians and with male mathematicians. While the SCII profile may lead some users to assume that the validity of the Occupational scales generalizes to opposite-sex norm groups, the research evidence for this assumption remains incomplete and somewhat equivocal.

Although social concerns about two forms of the SVIB are recent, the psychometric issue of separate forms has a long and involved history, extending back 40 years when the women's SVIB was first published. The issue was examined by Strong (1943) and others three decades ago and sporadically by others more recently. Seder (1940a, 1940b) tested men and women in two occupations on scales devised specifically for men and women and concluded that, "these data offer no evidence for important differences between interests of

men and women physicians nor between the interests of life insurance salesmen or women" (p. 136). Finding Seder's analysis less compelling than she did, Strong (1943) conducted a similar analysis using men and women in six occupations and found that, "men and women score approximately alike on some scales and different on other scales" (p. 572). However, results from other analyses led him to conclude that, "the interests of men and women are more similar than dissimilar" (p. 576), and that, "the same classification [of occupations] applies fairly well to both sexes" (p. 166).

Using male-developed keys for Form D of the Kuder Preference Record with men and women in 10 occupations, Hornaday and Kuder (1961) decided that "there are some occupations for which separate keys and norms are not essential and an even greater number of scales for which the same key may be used if differential sex norms are given" (p. 863). At the item level, Johanssen and Harmon (1972) recently explored whether the traditional SVIB empirical keying can be adapted to allow for a common form for men and women. They concluded that men and women within the same occupations have predominantly the same patterns of likes and dislikes relative to their respective reference groups. However, they did identify a small subset of items on which the men and women within the same occupation differ.

While the research evidence for differential validity of measured vocational interests with men and women has been fragmentary and equivocal, the developers of the SVIB, until recently, had taken the position that dual forms of the inventory were desirable. In his definitive SVIB handbook, Campbell (1971), while assuming two

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forms of the inventory, offered few explicit statements about the psychometric reasons for two forms and gave little advice regarding the counseling use of the men's form with women. Yet, before the development of the SCII, in practice, many counselors selectively administered the men's SVIB to women clients. Often it was used to supplement the women's form, which lacks Occupational scales in some areas of increasing interest to women. While Strong (1955) did not recommend this practice for the majority of women, Darley and Hagenah (1955) saw it as appropriate with women showing a high degree of career motivation, maturity, and ability.

This study assesses the predictive validity of Occupational scales when used with opposite-sex norm groups, as is now possible with the SCII. Specifically, this study examines the differential predictive validity of the men's SVIB over the college years for a group of highly able women and men. These students were winners of National Merit Scholarships; following the Darley and Hagenah (1955) recommendations, female Merit Scholars can be expected to be especially appropriate candidates for use of the men's form of the SVIB. Multivariate techniques were used to determine for women and men Merit Scholars the extent to which college majors and career choices at the end of college could be predicted from their interests prior to entering college.

METHOD

Sample

The men's SVIB (1966 revision) was administered by mail to National Merit Scholars of both sexes who were entering college in the fall of 1966. When nearly all of these students were about to enter their final year of college, in 1969, follow-up information was collected by mail regarding their major and career choices. Information was provided by 796 women (93.8 percent of the total group) and by 1,348 men (92.6 percent of the total). Their major and career choices were coded in 99 different major and career codes which were then reclassified into broader categories. It was possible to classify 570 women and 1,031 men in 16 major field categories and 452 women and 780 men in 10 career field groups. (See Tables 1 and 2).

The mean SVIB profile for this sample, for both men and women, differs markedly from what one would expect for men-in-general. Typical of high academic achievers, the group tends to have high scores in the sciences, in verbal areas, and in the arts, and low scores in mechanical and business areas.

TABLE 1

Summary of Sample Sizes for Major and Career Groups

Group	Validation for men	Cross-validation	
		Men	Women
Major			
Engineering	84	44	5
Mathematics	78	43	59
Physics	68	36	5
Chemistry	41	21	37
Biology	36	19	42
Life sciences (except biology)	22	13	15
Psychology	40	21	41
Behavioral sciences (except psychology)	31	16	35
Liberal arts	23	12	31
English	62	31	131
Philosophy	27	13	7
History	54	27	32
Languages	16	7	54
Art-music-speech	14	6	37
Political science	46	21	26
Business	41	18	13
Total	683	343	570
Career			
Mathematics	49	21	24
Engineer	51	27	3
Physical sciences	63	31	17
Life sciences	18	11	27
Medicine	68	36	30
College educator	71	37	58
Educator (unspecified)	79	39	124
Education—social sciences	26	14	107
Communications	17	11	43
Law-politics	69	37	19
Total	511	269	452

Discriminant Function Analysis

The purpose of the multivariate predictive study was to make an overall comparison of the men's form of the SVIB when used with men and women. Discriminant function analysis is an appropriate technique for predicting discrete outcome categories, such as career choice, from multiple continuous variables like the Strong scales. Computer program limitations precluded using all 54 Occupational scales of the SVIB as predictor variables. However, previous research (Borgen, 1972) using stepwise discriminant analysis in a similar situation has demonstrated that, "a representative subset of 22 SVIB Occupational scales could substitute for all of the

TABLE 2

Summary of Cross-Validation Hit-Rates Using Occupational Scales with Men and Women

Criterion group	n	Direct Hits		Science hits	Nonscience hits	Science versus non-science dichotomy	
		Base rate	Actual hits			Base rate	Actual hits
16 Major groups							
Men	348	12.6	23.6	80.1	72.1	50.6	76.1
Women	570	23.0	20.2	63.2	80.1	67.7	75.3
10 Career groups							
Men	269	14.5	23.0	71.8	66.7	51.3	69.1
Women	452	27.4	21.2	74.3	74.1	63.3	74.1

Occupational scales with only minimal loss of predictive precision" (p. 206). Consequently, the following multivariate results are based on 22 selected Occupational scales.

The 22 Occupational scales were chosen (a) to correspond with the major and career outcome groups and (b) to represent each of the major groups of the SVIB. The 22 scales selected and their SVIB groups were (I) Physician, Psychologist, Biologist; (II) Mathematician, Physicist, Chemist, Engineer; (III) Production; (IV) Artist, Music Teacher; (V) Personnel Director, Social Worker, Social Science Teacher; (VI) Artist, Music Teacher; (VII) Senior CPA, Pharmacist; (VIII) Life Insurance Salesman; (IX) Lawyer, Author-Journalist; (X) President-Manufacturing; and supplementary scales for Chamber of Commerce Executive and Physical Therapist.

Like many multivariate techniques, discriminant analysis computes predictive weights which optimize prediction for the particular sample, but the weights may be unstable when applied in a second, cross-validation sample. Weights are more unstable with smaller validation samples and many may result in spuriously high predictive hit rates in the initial sample. Since there were nearly twice as many men as women available for this study, multiple discriminant function weights were derived for a two-thirds sample of the men and then cross-validated on the remaining men and on all of the women. From a counselor's viewpoint, this method of analysis focuses on the issue of whether the predictive relationships established for the SVIB with men operate similarly with women.

Differential predictive validity for men and women was examined for predictions to both major and career choices near the end of college. Specific fields and sample sizes are shown in Table 1.

RESULTS

There were substantial statistical similarities among the discriminant variates derived for the major and career predictions. In both cases the first four discriminants were highly significant, while the fifth was significant at the .05 level. For the major field prediction the first discriminant accounted for 44 percent of the predictor variance, the second discriminant accounted for 20 percent, and all five accounted for 85 percent of the total variance. Results for the career field prediction were similar with 49 percent of the variance associated with the first discriminant, 20 percent with the second, and 92 percent of the total variance associated with the five discriminants. Correlations between the discriminant variates derived from the major and career analyses were examined in a sample including all of the men ($n = 1,031$) in the major field sample. These correlations demonstrated that the discriminant dimensions were very similar for the major and career predictions, with the first discriminants correlated .96, and the second .86.

The central index for comparing SVIB multivariate prediction with men and women is cross-validation hit rate, shown in Table 2. Direct hits are those where an exact prediction of the actual outcome group occurred using Cooley and Lohnes' (1962) CLASSIF method, a maximum likelihood procedure which assigns a person to a group on the basis of his or her discriminant scores. The full hit-miss tables were also recombined into 2 X 2 tables representing predictive accuracy on a science-nonscience dichotomy.

Interpretation of Table 2 is slightly clouded by the fact that the base-rate expectations were considerably higher for women than for men. That is, 23 percent of the women majored in English, and 27 percent planned

careers in education. Base rates for men were only about half as high. Consequently, the direct hits for men show a distinct improvement over the base rate while the direct hits for women are actually somewhat lower than the base rates. Nevertheless, in absolute terms, the percentage of hits for women is within three percentage points of the hits for men. Moreover, when the hit-miss tables (16 X 16 for majors and 10 X 10 for careers) were collapsed on the science-nonscience dichotomy, accuracy of prediction was essentially equal for men and women.

The interest dimensions tapped by the discriminant variates can be determined from the correlations between selected SVIB scales and the first two discriminants from the major and career field analyses (Table 3). The first discriminant might be labeled a science versus communications dimension. Reflecting its lesser contribution to predictive variance, the second discriminant correlates somewhat lower with the SVIB scales; its pattern of correlations suggests a business versus life science dimension.

The central question of differential validity can be investigated further by plotting the centroids (discriminant means) of the male and female career subgroups in a common discriminant space. Figure 1 shows these results for the major field subgroups, with the points derived for all of the women ($n = 570$) and a recombination of the two male samples ($n = 1,031$). Each point locates, by sex, the major field subgroup in the interest space defined by the first two discriminant functions; the two points for men and women within a major field are connected by a line to reflect the similarity of men and women in the predictive interest space. An analogous method was used to plot the discriminant means for 452 women and 780 men in the career subgroups (Figure 2).

Both Figures 1 and 2 show an overall similarity of the interest spaces for men and women, with the major and career groups for each sex having generally similar configurations and locations. The subgroups fall in the plane in areas which are congruent with the interest content attributed to the discriminant dimensions on the basis of the correlations in Table 3. For example, the business majors fall near one end of Discriminant II in Figure 1. The clustering of points is particularly similar for men and women along the horizontal dimension, which rather effectively separates science and nonscience majors for both men and women.

Despite the general similarity of the predictive interest spaces for men and women, the figures show some real and systematic within-field differences for men and women. In both figures the majority of between-sex lines have approximately equal slope and length, reflecting a tendency for women to express lower science

(Discriminant I) and lower business (Discriminant II) interests. Yet these within-sex differences are not constant: The women majoring in engineering and physics tend to have stronger science interests than the men; the general male-female differences also are not maintained in the career fields of law-politics, engineering, and the physical sciences. These differences apparently are not great enough to obliterate the generalizability of the men's SVIB with able women, but they may be sufficiently large to affect efforts to develop sex-free SVIB scales. If these differences were constant for all occupations, the practical problems of constructing a common SVIB for both sexes would be greatly simplified; each scale could then be adjusted by a constant appropriate for the sex of the test taker.

TABLE 3

SVIB Scale-Discriminant Correlations for Male Merit Scholars

Occupational and Nonoccupational scales	Discriminants derived from Occupational scales			
	Major groups		Career groups	
	I	II	I	II
Physician	40	63	36	65
Psychologist	-02	31	02	18
Biologist	52	54	51	40
Mathematician	38	19	36	02
Physicist	72	16	68	02
Chemist	84	17	79	07
Engineer	82	-16	72	-23
Production	58	-53	51	-48
Math-Science Teacher	75	09	72	12
Personnel Director	-57	-37	-57	-25
Social Worker	-75	20	-66	22
Social Science Teacher	-79	00	-76	12
Artist	23	29	23	14
Music Teacher	-67	38	-53	25
Senior CPA	35	-63	22	-47
Pharmacist	45	-18	43	06
Life Insurance Salesman	-71	-27	-67	-15
Lawyer	-57	-10	-59	-05
Author-Journalist	-37	12	-36	05
President-Manufacturing	-05	-63	-11	-62
Chamber of Commerce				
Executive	-71	-26	-76	-12
Physical Therapist	20	39	24	49
Masculinity-Femininity	70	-34	60	-28
Academic Achievement	04	47	05	43

Note. Decimal points omitted; $n = 1,031$.

DISCUSSION

The results suggest that the validity of the men's SVIB does generalize to able college women and that the

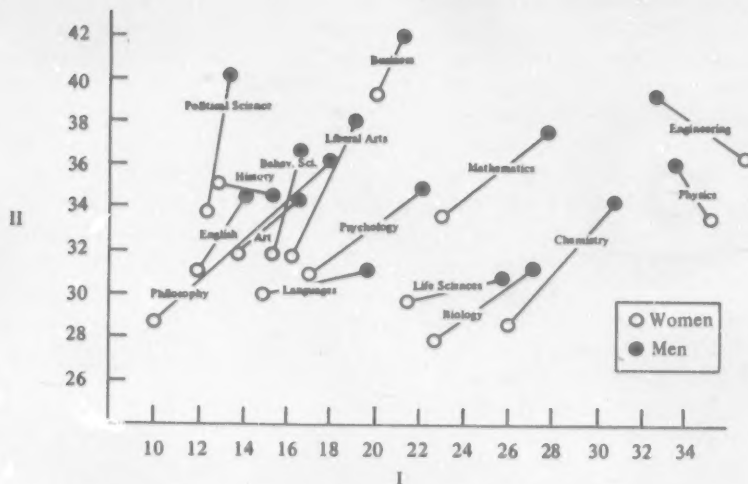


FIG. 1. Major field centroids on Occupational scales for women and men.

career choices of able men and women fit similar interest structures. Although the high base rates of women in certain fields did obscure somewhat the interpretation of the predictive hit-rate data, the fact remains that the utility of the male-validated equations for predicting female vocational decisions was maintained despite these conditions.

Nevertheless, the graphic portrayal of the discriminant means for male and female subgroups did reveal some systematic sex differences. Thus, the implications of this longitudinal, scale-level analysis are congruent with those from the item-level study by Johanssen and Harmon (1972): The current men's SVIB has a large component of variance which has equivalent predictive

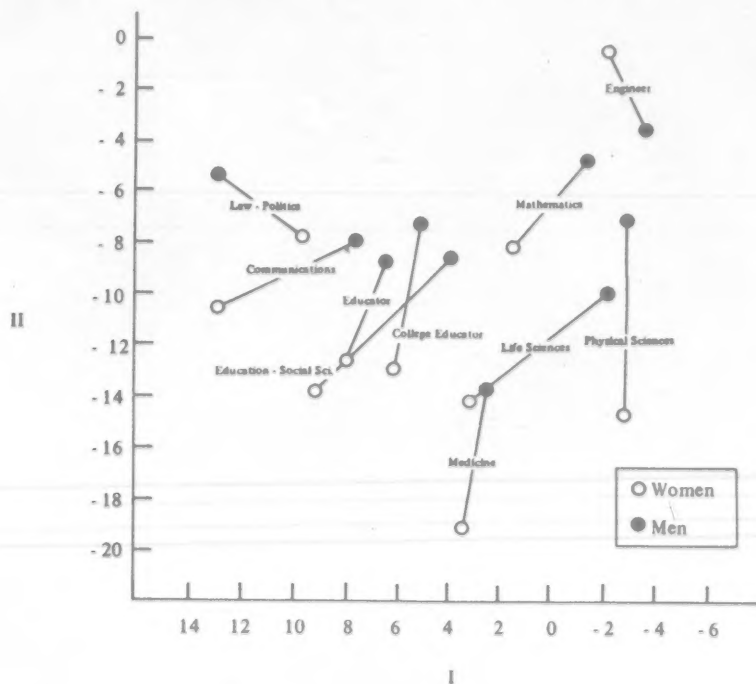


FIG. 2. Career field centroids on Occupational scales for women and men.

significance for men and women and a smaller but troublesome subset of item variance which elicits different responses from men and women.

Our results combine with those of previous studies to suggest that cross-sex Occupational scales, such as those now available on theSCII, have counseling utility, particularly if counseling focus is placed on general interest dimensions, such as science versus nonscience. Traditional interest methodology has looked at interest differences and deflected attention from the many ways in which interests of men and women are similar. Yet, Strong (1943) himself demonstrated the overall similarity of the structure of interests for men and women—a fact which has been corroborated here and by Holland (1966) and Cole (1973) as well. Thus, general interest dimensions appear to have quite equivalent predictive validity for women and men. If counseling focus is primarily toward large groupings of career choices, rather than toward specific occupations, the unisexSCII seems especially promising. Perhaps this kind of generalized career planning will be facilitated by the incorporation of Holland's occupational typology in theSCII.

An intriguing result here and elsewhere is that single-sexSVIB scales are possible for some occupations but less feasible for others. As Strong (1955) implied, this difficulty may not be due directly to sex, but to the fact that, in our present culture, men and women nominally in the same occupation tend not to do equivalent work. That is, women physicians tend to be better represented in obstetrics than in orthopedic surgery; women psychologists are more likely to be working as clinicians than as laboratory experimenters. Further, even with more precise occupational definition, it is plausible that men and women, for a variety of cultural reasons, tend to perform somewhat different functions and thus confound the study of sex differences in interests.

Generalization from this study is limited by the high ability level of the sample. Further research is needed to determine if male-normed Occupational scales are valid with more diverse groups of women. Likewise, there is

need for study of the validity of female-normed scales with men. In addition, the long-term predictive validity of opposite-sex interest scales should be examined.

The research model used in this study has promise for future studies of the cross-sex validity generalization function model would be particularly appropriate for grouping career outcomes in Holland's classification to test the differential predictive validity of interest scales.

REFERENCES

- Borgen, F.H. "Predicting Career Choices of Able College Men" from Occupational and Basic Interest Scales of the Strong Vocational Interest Blank." *Journal of Counseling Psychology* 19 (1972): 201-211.
- Campbell, D.P. *Handbook for the Strong Vocational Interest Blank*. Stanford: Stanford University Press, 1971.
- Campbell, D.P. *Manual for the Strong-Campbell Interest Inventory*. Stanford: Stanford University Press, 1974.
- Cole, N.S. "On Measuring the Vocational Interests of Women." *Journal of Counseling Psychology* 20 (1973): 105-112.
- Cooley, W.W., and Lohnes, P.R. *Multivariate Procedures for the Behavioral Sciences*. New York: Wiley, 1962.
- Darley, J.G., and Hagenah, T. *Vocational Interest Measurement*. Minneapolis: University of Minnesota Press, 1955.
- Holland, J.L. "A Psychological Classification Scheme for Vocations and Major Fields" *Journal of Counseling Psychology* 93 (1966): 278-2.
- Hornaday, J.A., and Kuder, G.F. "A Study of Male Occupational Interest Scales Applied to Women." *Educational and Psychological Measurement*, 21 (1961): 859-864.
- Johansson, C.B., and Harmon, L.W. "Strong Vocational Interest Blank: One Form or Two?" *Journal of Counseling Psychology* 19 (1972): 404-410.
- Schlossberg, N.K. "A Framework for Counseling Women." *Personnel and Guidance Journal* 51 (1972): 137-143.
- Seder, M.A. "Vocational Interests of Professional Women: Part I." *Journal of Applied Psychology* 24 (1940): 130-143.
- Seder, M.A. "The Vocational Interest of Professional Women: Part II." *Journal of Applied Psychology* 24 (1940): 265-272.
- Strong, E.K., Jr. *Vocational Interests of Men and Women*. Stanford: Stanford University Press, 1943.
- Strong, E.K., Jr. *Vocational Interests 18 Years After College*. Minneapolis: University of Minnesota Press, 1955.
- Tittle, C.K. "Sex Bias in Educational Measurement: Fact or Fiction?" *Measurement and Evaluation in Guidance* 6 (1974): 219-226.

Dealing with Male-Female Differences on Separately Normed Scales in the Career Development Inventory

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Abstract. Although the number of women entering nontraditional occupations is increasing dramatically, both women and men are still, for the most part, entering occupations traditional for their sex and responding to interest inventory items in ways that are traditional for their sex. Even men and women in the same occupation tend to respond significantly differently to certain interest inventory items. There is reason to believe that these differences reflect general male-female differences that are constant across occupations rather than differences specific to a particular occupation. For example, women in a skilled trade do not, for the most part, give up their

traditional concern for household and children. An attempt to partial out this constant difference across occupations was made in the Career Development Inventory (CDI), by Kuder and Diamond, through a linear transformation involving the individual's mean and standard deviation on 28 same- or similarly-named scales. The results showed a lessening of the distance between scores for a given occupation on the two sets of norms, although ranks of the scores within norm groups, as expected, did not change. Implications for interest measurement research and development are discussed.

We are no longer surprised to see women in hardhats, tools at their waists, working with a construction crew. Newspapers and magazines frequently feature photographs of women lineworkers perched atop a telephone pole, or of women fire fighters, engineers, architects, scientists. Women are seen in nontraditional jobs far more frequently today than they used to be. To a lesser extent, the same is true of males in nontraditional jobs—nurses, dietitians, primary school teachers.

We are still a long way, however, from having a eliminated stereotypical behavior to the point where men and women as a whole, and even men and women in the same occupation, respond similarly to interest inventory items. And countless studies show that members of both sexes are still, for the most part, choosing occupations that are traditional for their sex. Consequently, separate norms by sex are still necessary for valid interpretation of interest inventory results.

HOMOGENEOUS VS. EMPIRICAL SCALES

Providing separate norms on all scales is no problem when the inventory is an internally built one, with homogeneous or general interest scales. The individual's preferences are compared with those of a general reference group of the same sex and age or grade group. Empirically built inventories, however, compare the individual's responses with those of men or women in a variety of occupations, and they reflect the reality of the world of work as it has been until now—and as it still may be, for the most part. Most such inventories have more male-normed than female-normed scales, and few

scales that have been normed on either sex for occupations that are nontraditional for that sex. Until recently, it was difficult to obtain large enough random samples for this purpose. And although a number of publishers are now attempting to equalize the options for both sexes, the process of first securing the cooperation of professional associations, trade unions and other sources of criterion groups and then obtaining the necessary data and building the new scales is a slow and expensive one.

In the meantime, the best solution appears to be to offer scores on all scales—regardless of norm group—to all respondents to an empirically built interest inventory. Emphasizing rank rather than magnitude of scores is also suggested in what, it is hoped, is a period of transition. As Kuder (1970, p. 207) pointed out, for exploration purposes "it is not essential that absolute measures be used, or even that measures be comparable from one person to another, in order for an inventory to be valid for use in counseling." The purpose of an interest inventory in counseling, he recognized, is not to rank a number of people but "to rank a multitude of occupations for a single person." This approach is particularly appropriate in looking at scores on scales normed on a sex group or some other group of which one is not a member. It is also appropriate, of course, in looking at scores on one's own sex norms for exploration purposes.

On homogeneous scales, which are usually based on peer group (e.g., sex, age, grade) responses rather than on responses of people in occupations or fields of study in the given areas, the norms reflect traditional sex-role socialization; and profile contradictions may show up on the two sets of norms for those scales that represent nontraditional interests for one of the sexes. Girls, for

example, generally rank much lower in mechanical interest on boys' norms than they did on girls' norms. Still, looking at ranks on both sets of norms permits them to view an important aspect of the reality situation. And emphasizing ranks on norms for their own sex completes the picture and lets them know that there are highly viable options that they might not otherwise be aware of.

On empirically built scales, however—where the comparison is with responses of people engaged in specific occupations or fields of study—scores generally do fall in approximately the same rank order on both sets of norms for same- or similarly-named scales, providing evidence of the validity of using scores on other-sex norms. The reason for similarity in rank order is that responses of males and females in the same occupation, while not identical, tend to be more similar than dissimilar.

DEALING WITH DIFFERENCES STATISTICALLY

Why, though, should men and women in the same occupation show marked significant differences in their responses to a number of items in an interest inventory? Might some of the differences, as Johansson (1975) has suggested on the basis of his research with the Strong Vocational Interest Blank (SVIB), be reflecting general male-female differences that are constant across occupations—rather than differences specific to a particular occupation? For example, women who enter the skilled trades do not, for the most part, give up their traditional concern for household and children. One might theorize that their role becomes more androgynous than either traditionally male or traditionally female. The same might be expected of men with a history of traditional male socialization who enter occupations that until now have been traditionally female. (In the foreseeable future, of course, it is quite unlikely that an exodus from the multiple-options world of "men's work" into the restricted world of "women's work" will reach anywhere near the same proportions as the movement in the reverse direction.)

It was just such theorizing that led to an attempt to deal statistically with the constant sex differences across occupations in an instrument in the process of development—the Career Development Inventory (CDI) by Kuder and Diamond (see Diamond and Raju, 1975), a component of the Career Development Program for grades 9 and 10. The CDI consists of an interest survey using the 100 Kuder Occupational Interest Survey (OIS, Form DD) items and a personal data form. It provides scores in six areas by three entry-level scales collapsed from the 162 OIS scales, which represent specific

occupations and college-major fields of study. The areas are Technical/Mechanical/Skilled, Scientific/Theoretical, Artistic/Literary/Musical, Social Service/Personal Service, Persuasive/Managerial, and Clerical/Computational. The three entry levels are Early (requiring a high school education or less), Delayed (requiring post-secondary education, training, or experience) and Late (requiring four-year graduation from college, or more). No scores are reported for Scientific/Theoretical Early entry, since there are very few occupations at that level.

Existing OIS scales—both male-normed and female-normed—were assigned to appropriate CDI scales. Some OIS scales were eliminated because they were considered too specialized for the purpose of the inventory. Others—various engineering and social service scales, for example—were assigned partial weights to avoid overrepresentation in a given CDI scale, so that their combined weights equaled a total of 1. Weighted averages were then computed for OIS criterion group response proportions for each CDI scale, and values for each of the six possible response patterns for each OIS items were derived, using the system described in the Kuder Form DD *General Manual* (Kuder, 1976). Male-normed and female-normed OIS scales were treated separately.

To give one example of how OIS scale data were combined for a CDI scale: The Scientific/Theoretical male-normed Late-entry scale was derived from OIS criterion group response data for male chemists, computer programmers, dentists, electrical engineers, mathematicians, math teachers, meteorologists and 11 other occupations. The female-normed scale was derived from criterion-group responses for computer programmers, administrative and school dietitians (one-half weight each), math teachers, nutritionists, psychologists and science teachers. In addition, two Academic Level of Interest (ALI) scales—one based on data from female college major OIS criterion groups and one on data from corresponding male groups—were derived. Not all the CDI scales were derived from OIS data for both sexes. At present, for example, there are no female norms for the OIS occupational scales from which the CDI Technical/Mechanical/Skilled scales were derived.

To deal with differences in male-female response rates that seem to be related to traditional sex roles, a procedure was suggested by Kuder in which individual means and standard deviations for 56 scales—28 pairs (male- and female-normed) of same-named or similarly named OIS scales, listed in Table 1—are obtained for each individual and used in a linear transformation that lessens the distance between scores on paired scales across sex norms.

To test the assumption that scores on the two sets of norms would be similar in rank, correlations between the

two sets of scales—male-normed and female-normed—were obtained for each of 639 males and 353 females from a field-test sample. Median correlations were .87 for males and .86 for females; modes were .90 and .89, respectively. Correlations ranged up to .97, with only 5 of the 992 correlations falling below .60.

The following constants are then derived for each individual:

$$A_M = \frac{S_M + S_F}{2(S_M)} \quad A_F = \frac{S_M + S_F}{2(S_F)}$$

$$B_M = \frac{M_M + M_F}{2} - M_M A_M$$

$$B_F = \frac{M_M + M_F}{2} - M_F A_F$$

where A_M and B_M are the constants for males,

A_F and B_F are the constants for females,

S_M and S_F are the standard deviations for males and females, respectively,

and

M_M and M_F are the means for males and females, respectively.

Each of the 28 lambda scores (denoted by λ) is transformed by one of two equations. The transformation is a simple linear one, affecting only means and standard deviations. Equation 1, to be used if lambda is based on male-normed DD scales, and which uses the two constants for males, is

$$\bar{\lambda} = A_M \lambda + B_M$$

Equation 2, to be used if lambda is based on female-normed scales, and which uses the two constants for females, is

$$\bar{\lambda} = A_F \lambda + B_F$$

Then, for each of the ten CDI scales with both a male-based and a female-based lambda—that is, the ten scales for which both male and female OIS criterion group data were available—and for the Academic Level of Interest score, based on data from OIS male and female college major groups, a single lambda is obtained by simply averaging the two transformed lambdas. For the remaining scales, only the applicable equation (1 or 2) is used. Scores are reported as High, Moderate or Low rather than lambdas, to avoid overemphasis on small score differences, since the CDI is intended to stimulate exploration of broad options rather than to encourage focus on specific occupational choice.

Table 1 lists the 28 pairs of same- or similarly-named scales used to obtain the means and standard deviations for the equations. As shown in Tables 2 and 3, which give the rank order of original and transformed lambdas for the highest 30 ranks on the 56 OIS scales (28 pairs) for the same occupation for a male and a female subject, respectively, the rank order of the lambdas within sex doesn't change, but it does change across sex norms. (These subjects were from a pool of cross-validation subjects who had taken the OIS.)

TABLE 1

Occupations and College Majors Having
Both Male-Normed and Female-Normed
Kuder DD Scales

1. Accountant
2. Bookkeeper
3. Bookstore Manager
4. Computer Programmer
5. Counselor, High School
6. Florist
7. Interior Decorator
8. Lawyer
9. Librarian
10. Math Teacher, High School
11. Physical Therapist
12. Psychologist, Clinical
13. Science Teacher, High School
14. Social Caseworker
15. Social Worker, Group
16. Social Worker, Psychiatric
17. X-ray Technician
18. Art Major
19. Biology Major
20. Elementary Education Major
21. English Major
22. Foreign Language Major
23. History Major
24. Music Major
25. Physical Education Major
26. Political Science Major
27. Psychology Major
28. Sociology Major

TABLE 2

Ranking of Scores of a Male Bricklayer on
DD Male- and Female-Normed Scales
before and after Modification
for Influence of Sex

RANK	DD SCALES			
	Original M ^a	F ^b	After Modification M ^a	F ^b
1	2			2
2	17		2	
3	20			20
4	25			25
5	3		17	
6	5		20	
7	6		25	
8	10			1
9	11			10
10	8			6
11	1			15
12	14		3	
13	15		5	
14		2	6	
15	13		10	
16	23		11	
17		20		5
18		25		11
19		1		17
20		10	8	
21	9			23
22	16		1	
23	26		14	
24		6	15	
25		15	13	
26	28		23	
27		5		8
28		11		9
29		17		14
30		23		3

Note: See table 1 for names of scales

^aMale-normed

^bFemale-normed

Note that new lambdas on male-normed scales tend to move up in rank when the subject is female, down when the subject is male; and new lambdas on female-normed scales tend to move up when the subject is male, down when the subject is female. Thus the gap is reduced between scores on male-normed and female-normed scales for the same occupation.

TABLE 3

Ranking of Scores of a Female High School Senior
on DD Male- and Female-Normed Scales
before and after Modification
for Influence of Sex

RANK	DD SCALES			
	Original M ^a	F ^b	After Modification M ^a	F ^b
1		20	7	
2		22	18	
3		21		20
4		18		22
5		28		21
6		23		18
7		7	21	
8		26	22	
9		27		28
10	7			23
11		16	28	
12		24		
13	18		16	
14		14		26
15		25		27
16		6		16
17		15		24
18		5	14	
19		12	15	
20		3	20	
21	21		23	
22	22		26	
23		9		14
24		8		15
25		19	24	
26	28			6
27	16		27	
28		11	25	
29	14			15
30	15		9	

Note: See Table 1 for names of scales.

^aMale-normed

^bFemale-normed

As an illustration, look at the scores of the male bricklayer in Table 2. The original rank of his score on scale 17 (X-ray Technician) is 2 for the male-normed scale and 29 for the female-normed scale. After modification by the appropriate equation, however, his score on scale 17 moves down to 5 on male norms and up to 19 on female norms. The occupation represented by his

highest-ranking score on male norms originally ranked 14 on female norms, but the transformation moved it up to 1 on female norms (down to 2 on male norms). This result makes a good deal of sense in the light of the fact that we are looking at ranks for the same occupation. Apparently the equation is successful in factoring out the common concerns of men as males and women as females. We should recognize, however, that the interests themselves remain unchanged and undoubtedly will do so until other interventions provide some exploratory experiences into hitherto unexplored areas. We cannot, for example, expect that a woman who has never had any experience with or an opportunity to develop an interest in mechanical or scientific activities will, by our factoring out of her scores the concerns she shares with women generally, across occupations, receive high scores on the Technical/Mechanical/Skilled or Scientific/Theoretical scales.

VALIDITY CONSIDERATIONS

Since the lambda transformation is simply a straight linear one, it should not affect the validity of the scores. Nor does the averaging of two transformed scores for the same scale have any apparent effect on validity, as illustrated by the hits and misses study for 202 males and 111 females from a pool of cross-validation subjects who had taken the OIS and whose responses were rescored on the CDI, and for 101 randomly selected college-bound students and 327 non-college-bound students—both male and female—from the CDI field-test sample (Diamond and Raju, 1975). The hit rate (correct classifications) was 78 percent for the occupational scales and 77 percent for the ALI scale.

Accuracy of classification was further checked by scoring 42 "ideal" criterion groups on the CDI by marking the inventories with modal criterion group responses for the corresponding OIS scales so that the appropriate OIS lambda would be 1.00. Thirty-six cases (86 percent) of the resulting CDI profiles met classification expectations. Of the six cases that did not, five had moderate scores on the appropriate scale but high scores on a closely related scale.

Since both male and female cross-validation subjects were not available for all of the occupational scales (for example, there were no women from the Technical/

Mechanical/Skilled occupations), further studies will need to be done. Such studies should be possible if current attempts to obtain OIS criterion groups of women in the skilled trades and men and women in occupations that are nontraditional for their sex are successful. This would also make it possible to add more male-based and female-based response data to the current CDI scales, thus both broadening the foundation of the scales and providing data for use of both of the foregoing equations for those scales where only one can be used now.

CONCLUSION

Resolving the technical issues of sex bias and sex fairness in career interest measurement, we can see from this paper, is no simple, straightforward task. Users of interest inventories, understandably, are impatient for change. They worry, as do we in measurement, about perpetuation of stereotypes. But inventories can actually help bring about change, if used appropriately; and these changes can then be accurately reflected in future revisions of inventories and in new inventories.

Counselors and all others who use inventories should keep firmly in mind the essential purpose of an interest inventory: to serve as a guidance tool, with other relevant information such as achievements, activities and aspirations, that will suggest new directions and the widest possible options to the individual and encourage rather than limit exploration. The discussion presented in this paper is intended to help further that purpose.

REFERENCES

- Diamond, E.E., and Raju, N.S., *Technical Supplement: Career Development Inventory (Career Development Program)* (Revised edition). Chicago: Science Research Associates, 1975.
- Johannson, C.B. "Technical Aspects: Problems of Scale Development, Norms, Item Differences by Sex, and the Rate of Change in Occupational Group Characteristics II." In E.E. Diamond, editor, *Issues of Sex Bias and Sex-Fairness in Career Interest Measurement*. Washington: National Institute of Education, 1975.
- Kuder, F. *General Interest Survey (Form E) Manual*. Chicago: Science Research Associates, 1975.
- Kuder, F. *Occupational Interest Survey (Form DD) General Manual*. Chicago: Science Research Associates, 1976.

Relationships Between Female and Male Interest Scales for the Same Occupations*

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Abstract. The relationships between the 37 pairs of same-named Occupational scales for men and women on the Strong-Campbell Interest Inventory were studied for 1044 female and 1134 male college freshman. The two sets of scales should not be regarded as equivalent scales (median correlations ranged from .75 to .79). Most of the mean differences between the matched pairs of scales were substantial (≥ 5 standard scores). Contrary to prior expectations, the use of the cross-sex scales reinforces sexual stereotyping. Both sexes scored relatively high on

cross-sex scales representing "traditional" occupations for their sex and relatively low on scales representing "nontraditional" occupations. Various recommendations for alleviating the interpretive problems caused by the use of the cross-sex scales were considered (e.g., using separate sex norms, clarifying the predictive validity of the scales, revising the scale construction procedures, and placing greater reliance on the Basic Interest scales).

The new Strong-Campbell Interest Inventory (SCII) retains abridged versions of the separate occupational scales for men and women found on the old Strong Vocational Interest Blanks for Men and Women (SVIB-M and SVIB-W). In all, there are 37 pairs of female and male occupational scales for the same occupations. Individuals who complete the SCII receive scores for both the men's and women's scales.

The use of the men's scales has been advocated for some time for women with "career" or "masculine" interests in order to expand their vocational alternatives (Campbell, 1966; Darley and Hagenah, 1955; Laime and Zytowski, 1963; Munley, Fretz and Mills, 1973; Stanfiel, 1970). Although not stated explicitly by these authors, presumably the women's scales should be used with men who have "domestic" or "feminine" interests in order to increase the options they have to consider. Schollossberg and Goodman (1972) have urged that both sets of occupational scales be used with both men and women. These arguments suggest that individuals may break free of sexual stereotypes if they obtain scores on the cross-sex occupational scales as well as on the same-sex occupational scales.

Unfortunately, the interpretation of scores on the cross-sex scales is unclear. A number of studies have explored the use of male Occupational scales with women (Hornaday and Kuder, 1961; Laime and Zytowski, 1963; Lunneborg, 1975; Munley et al., 1973; Seder, 1940a, 1940b; Stanfiel, 1970; Strong, 1943). Although the male and female scales yielded similar results in some instances (e.g., Seder, 1940a, 1940b), in most cases the use of separate scales or separate norms appeared to be

necessary. Most of the studies noted that female college students frequently obtained higher scores on the men's scales than they did on the women's scales. As a consequence, most of the authors recommended that the men's scales be used together with the women's scales in counseling career-oriented women.

The use of the women's occupational scales with men has rarely been investigated. In two recent studies with the new SCII, Campbell (1974) and Creaser and Carsello (1976) found that both males and females often scored higher on the occupational scale for the other sex than on that same occupational scale for their own sex. Despite interpretive problems, Campbell (1974) recommended that clients be given their scores on all scales so that they might have a "maximum of information."

Relatively few guidelines are available for interpreting scores on the cross-sex occupational scales. The dissimilarities between the scales may reflect real differences in the interests of men and women within the occupation. For example, male army officers are more likely to be involved in military activities than female army officers. Male pharmacists are more often engaged in business management than female pharmacists. For the most part, however, the differences between the scores on the male and female scales for the same occupation are probably attributable to the techniques used in constructing the Occupational scales (Johansson and Harmon, 1972; Lunneborg, 1975).

Additional research to help interpret the meaning of the scores on the cross-sex scales is needed (Association for Measurement and Evaluation in Guidance Commission on Sex Bias in Measurement, 1973; National Institute of Education, 1974). The purpose of this study was threefold: (a) to determine the magnitude of the relationships between the female and male occupational

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scales for the same occupations, (b) to clarify the nature of the differences between scores obtained on the male and female occupational scales, and (c) to make recommendations for alleviating the interpretive difficulties associated with the two sets of occupational scales.

METHOD

Subjects. A total of 1134 males and 1044 females who voluntarily completed a prepublication form of the SCII as part of the Freshmen Placement Testing Program at the University of Wisconsin-Madison during the late spring and summer of 1973 served as subjects. These students, who represented 50.1 percent of the entering freshmen males and 51.7 percent of the entering freshmen females, closely resembled their classmates in academic achievement as measured by the College Qualification Tests.

Statistical analysis. The correlations between each of the same-named occupational scales for men and women were calculated to determine the strength of the relationship between the scales. The mean scores for each pair of scales were compared to determine the magnitude and the direction of the differences between the scores on the same-named scales. The nature of the differences between the matched occupational scales was analyzed by means of (a) the Holland letter-codes assigned to each of the occupational scales and (b) the basic interest factors associated with each of the scales.

According to the SCII *Manual*, men in the General Reference Sample scored substantially higher on the realistic general occupational theme scale while women scored notably higher on the artistic scale (Campbell, 1974, p. 33). These differences are much larger than the differences shown for the remaining general occupational theme scales used in assigning the Holland codes for each occupational scale. It was hypothesized that females would obtain higher scores on the male occupational scales coded as artistic (A) occupations and equal or lower scores on the male occupational scales coded as realistic (R) occupations than they would on the female scales for the same occupations. Conversely, it was hypothesized that males would obtain higher scores on the female occupational scales with R letter-codes and equal or lower scores on the female scales with A letter-codes. The Holland codes for each of the occupational scales are listed in the SCII *Manual* (Campbell, 1974, pp. 61-73).

Men in the General Reference Sample scored higher on 11 of the 23 basic interest scales (agriculture, ad-

venture, military activities, mechanical activities, science, mathematics, athletics, public speaking, law/politics, sales and business management; $p < .001$; Campbell, 1974, p. 38). Women in the General Reference Sample scored higher on 10 of the scales (nature, medical service, music, art, writing, teaching, social service, domestic arts, religious activities and office practices; $p < .001$). No significant differences between men and women were obtained for two of the scales (medical science and merchandising; $p > .05$).

It was hypothesized that women would receive higher scores on the male occupational scales which were closely associated with the basic interests preferred by women and equal or lower scores on the male occupational scales which reflected basic interests preferred by men than they would obtain on female scales for the same occupations. It was expected that men would score relatively high on the female occupational scales which tapped interests ordinarily selected by men and that they would score relatively low on the female scales closely related with the types of interests usually chosen by women. The correlation coefficients between the basic interest scales and the occupational scales for the total sample of 2178 men and women were used to identify the basic interest factors contributing to each scale.

The three highest (either positive or negative) correlations between the basic scales and each of the occupational scales were identified and classified as indicating either "male" or "female" interests based on the sex differences noted above. In those cases where a majority interest pattern could not be determined for an occupational scale, the fourth highest correlation with the basic scales was also analyzed. The correlations between the basic interest scales and the occupational scales provide more information than the Holland letter-codes in that (a) more specific interests are measured, (b) negative as well as positive relationships are taken into consideration, and (c) every Occupational scale may be classified in terms of "male" or "female" interest patterns.

RESULTS

Strength of Relationships.

The correlation coefficients between each pair of male and female occupational scales are reported in Table 1. The correlations ranged from .52 to .93 with a median value of .79 for the males. For females, the correlations ranged from .50 to .92 with a median of .75.

TABLE 1

Correlations Between Same-Named Male and Female Occupational Scales

Occupational scale	Sample	Mean standard score on male scale	Mean standard score on female scale	Correlation coefficient Present study	Campbell study (1974)
Accountant	m	15	29	.81	.77
	f	5	17	.75	.75
Advertising Executive	m	28	36	.52	
	f	35	32	.58	
Army Officer	m	26	42	.64	.65
	f	18	30	.50	.63
Artist	m	29	29	.85	.81
	f	38	29	.87	.83
Banker	m	24	30	.79	.76
	f	17	24	.75	.73
Business Education Teacher	m	24	15	.74	.75
	f	23	15	.74	.69
Buyer	m	18	24	.75	.76
	f	17	20	.75	.75
College Professor	m	30	33	.64	.73
	f	40	32	.57	.75
Computer Programmer	m	34	37	.90	.91
	f	26	26	.90	.88
Credit Manager	m	25	29	.79	
	f	22	21	.79	
Dentist	m	32	34	.75	.61
	f	32	26	.75	.76
Dietitian	m	30	27	.67	
	f	35	31	.73	
Elementary Teacher	m	27	20	.65	.57
	f	34	29	.59	.46
Engineer	m	33	36	.90	.90
	f	24	23	.89	.89
English Teacher	m	28	21	.89	.89
	f	38	31	.87	.90
Guidance Counselor	m	23	20	.76	.83
	f	26	26	.76	.78
Interior Decorator	m	24	11	.76	.72
	f	37	15	.68	.68
Lawyer	m	28	31	.75	.71
	f	37	28	.72	.73
Librarian	m	23	28	.79	.75
	f	34	28	.76	.73
Life Insurance Agent	m	18	25	.93	.83
	f	17	22	.88	.75
Mathematician	m	26	31	.80	.79
	f	28	20	.77	.77
Math-Science Teacher	m	34	38	.70	.64
	f	29	29	.70	.64
Medical Technologist	m	25	36	.87	.85
	f	21	27	.89	.89
Musician	m	38	25	.61	.56
	f	47	36	.62	.59
Nurse, Licensed Practical	m	30	19	.63	
	f	41	23	.75	
Nurse, Registered	m	28	26	.85	
	f	36	33	.87	

Optometrist	m	29	37	.62	
	f	25	25	.61	
Pharmacist	m	27	34	.62	.46
	f	25	28	.63	.58
Physical Therapist	m	29	37	.87	.87
	f	27	36	.90	.90
Physician	m	28	37	.80	.76
	f	28	28	.78	.81
Psychologist	m	28	28	.80	.82
	f	34	23	.82	.85
Recreation Leader	m	23	27	.92	.94
	f	24	31	.92	.92
Reporter	m	29	31	.86	.84
	f	39	32	.84	.85
Social Science Teacher	m	28	30	.69	.74
	f	30	31	.68	.72
Social Worker	m	21	22	.89	.91
	f	28	26	.87	.90
Speech Pathologist	m	39	42	.81	
	f	43	35	.81	
Veterinarian	m	24	36	.74	
	f	27	29	.67	
Median	m			.79	.76
	f			.75	.76

^am = male (N = 1134); f = female (N = 1044)

The correlations obtained in the present study are comparable to those obtained by Campbell (1974) as shown in the last column of Table 1. Campbell, who studied 29 of the 37 pairs of occupational scales, found a median correlation of .76 for both the male and female subjects.

The median correlations between the pairs of matched male and female occupational scales indicate that most of the scales should not be used interchangeably. Most of the correlations are considerably lower than the short-term test-retest reliabilities for both the male and female scales (Campbell, 1974, pp. 58-59).

Comparison of Mean Scores

The rank order of the mean differences between the male and female occupational scales for each sample is shown in Table 2. Men frequently obtained higher scores on the female scales (26 of 37 comparisons) while women often obtained higher scores on the male scales (21 of 37 comparisons).

Some of the differences are striking. For example, females averaged 22 points higher on the male scale for interior decorator than they did on the female scale. The mean score for males was 16 points higher on the female army office scale than it was on the male army officer scale.

Most of the mean differences between the two sets of scales (20 of 37 for males and 22 of 37 for females) were

TABLE 2

Mean Differences Between Standard Scores on
Same-Named Male and Female Scales

Females			Males		
Occupational scales	Holland code ^a	Mean difference ^b	Occupational scales	Holland code ^a	Mean difference ^b
Interior Decorator	AE	-22	Army Officer	RE	-16
Nurse, Lic. Practical	SRC	-19	Accountant	C	-14
Musician	A	-11	Veterinarian	I	-12
Psychologist	IAS	-11	Medical Technologist	IR	-11
Artist	A	-9	Physician	I	-9
Lawyer	E	-9	Advertising Executive	A	-8
Business Ed. Teacher	CES	-8	Optometrist	I	-8
College Professor	IA	-8	Physical Therapist	IRS	-8
Mathematician	I	-8	Life Insurance Agent	E	-7
Speech Pathologist	IS	-8	Pharmacist	IR	-7
English Teacher	AS	-7	Banker	CE	-6
Reporter	A	-7	Buyer	EC	-6
Dentist	IR	-6	Librarian	A	-5
Librarian	A	-6	Mathematician	I	-5
Elementary Teacher	SEA	-5	Credit Manager	CE	-4
Dietitian	REC	-4	Math-Science Teacher	ICR	-4
Nurse, Registered	RI	-3	Recreation Leader	SER	-4
Advertising Executive	AE	-3	College Professor	IA	-3
Social Worker	S	-2	Computer Programmer	IRC	-3
Credit Manager	ECS	-1	Engineer	IR	-3
Engineer	IR	-1	Lawyer	E	-3
Computer Programmer	IRC	0	Speech Pathologist	IS	-3
Guidance Counselor	SCE	0	Dentist	IR	-2
Math-Science Teacher	IRS	0	Reporter	A	-2
Optometrist	IRC	0	Social Science Teacher	SEC	-2
Physician	IRS	0	Social Worker	S	-1
Social Science Teacher	SEC	1	Artist	A	0
Veterinarian	RI	2	Psychologist	IAS	0
Buyer	ECS	3	Nurse, Registered	SI	2
Pharmacist	EIC	3	Dietitian	IC	3
Life Insurance Agent	ES	5	Guidance Counselor	SEC	3
Medical Technologist	IRC	6	Elementary Teacher	SC	7
Banker	CE	7	English Teacher	AS	7
Recreation Leader	SEC	7	Business Ed. Teacher	CE	9
Physical Therapist	SIR	9	Nurse, Lic. Practical	CRI	11
Accountant	CE	12	Interior Decorator	AE	13
Army Officer	RIC	12	Musician	A	13

^aHolland letter-code for cross-sex occupational scale is listed.

^bMean standard score on same-sex occupational scale minus mean standard score on opposite-sex occupational scale. A negative score indicates that the students obtained higher standard scores on the cross-sex occupational scale.

equal to or greater than five standard scores. These differences are large enough to yield different interpretations for the two sets of scores in most circumstances.

Interpretation of Scores

As hypothesized, women scored relatively high on the

"artistic" male occupational scales and relatively low on "realistic" male occupational scales ($p < .05$; Fisher exact probability test; see Table 3). Men obtained the opposite results as predicted ($p < .05$; Fisher exact probability test).

TABLE 3

**Relationships Between Holland Letter-Codes and
Relative Magnitude of Standard Scores on
Cross-Sex Occupational Scales**

Holland Codes	Number of higher mean scores on cross-sex Occupational scales	Number of equal or lower mean scores on cross-sex Occupational scales	Total
Females			
"Artistic" scales ^a	10	0	10
"Realistic" scales ^b	5	8	13
Total	15	8	23
Males			
"Artistic" scales ^a	4	5	9
"Realistic" scales ^b	9	1	10
Total	13	6	19

$p < .05$ (Fisher exact probability test)

$p < .05$ (Fisher exact probability test)

^aAll cross-sex SCII occupational scales with an artistic (A) designation as part of the Holland code (Campbell, 1974, pp. 61-63).

^bAll cross-sex SCII occupational scales with a realistic (R) designation as part of the Holland code (Campbell, 1974, pp. 61-63).

The explanation for the differences between the male and female scales may be traced principally to the nature of scale construction coupled with the sex differences in the popularity of the items in the SCII item pool. Items for the occupational scales were selected if they differentiated between men in the occupation and men-in-general for the men's occupational scales or between women in the occupation and women-in-general for the women's scales. According to the SCII *Manual* (Campbell, 1974), men- and women-in-general differ markedly (15 percentage points or more) in their answers to one-half of the SCII items. Because of the widespread differences in the interests of men- and women-in-general, occupational scales for men and women for the same occupation will contain different items even when the interests of men and women within the occupation are the same.

An occupational scale will consist of items reflecting interests (likes or dislikes) which are atypical for members of that sex but which may be typical for members of the other sex. For example, both men and women interior decorators like the items "Dramatics" and

"Symphony concerts." Women-in-general like both of these items, but men-in-general do not (Campbell, 1971). These items are scored only on the male scale because they represent distinctive interests only for men. When females are scored on the men's interior decorator scale, their scores will be somewhat inflated. Individuals will obtain spuriously high scores on those cross-sex occupational scales which represent interests usually preferred by members of their own sex.

As shown in Table 4, both hypotheses pertaining to the relationships between the basic interest factors and the relative magnitude of the scores on the cross-sex occupational scales were supported. Both sexes obtained higher mean scores on the cross-sex occupational scale than the same-sex scale if the former scale was highly correlated with basic interests preferred by that sex, but lower mean scores on the cross-sex scale if that scale was closely associated with basic interests preferred by the other sex ($p < .05$; Fisher exact probability test).

TABLE 4

**Relationships Between Basic Interest Factors and
Relative Magnitude of Standard Scores on
Cross-Sex Occupational Scales**

Basic Interest factors	Number of higher mean scores on cross-sex Occupational scales	Number of equal or lower mean scores on cross-sex Occupational scales	Total
Female			
Cross-sex Occupational scales closely associated with basic interests preferred by women	17	2	21
Cross-sex Occupational scales closely associated with basic interests preferred by men	4	12	16
Total	21	16	37
Males			
Cross-sex Occupational scales closely associated with basic interests preferred by women	3	9	12
Cross-sex Occupational scales closely associated with basic interests preferred by men	23	2	25
Total	26	11	37

$p < .05$ (Fisher exact probability test)

For example, the male licensed practical nurse scale taps interests usually preferred by women (medical service, domestic arts and social service interests) while the male accountant scale reflects interests most often preferred by men (business management, sales and mathematics). Because of the procedures used in constructing the SCII scales, the male licensed practical nurse scale contains a relatively large number of "easy" items for women (items frequently preferred by women) whereas the male accountant scale possesses a relatively large number of "difficult" items for women (items frequently rejected by women). As a result, women score higher on the male licensed practical nurse scale than on the female licensed practical nurse scale, but lower on the male accountant scale than on the female accountant scale.

In essence, both sexes obtained relatively high scores on cross-sex scales which represented "traditional" occupations for their sex and relatively low scores on scales which represented "nontraditional" occupations. Contrary to the opinion of many previous investigators, the use of the cross-sex scales has the net effect of strengthening, not reducing, the results of social conditioning.

The method of scale construction used for the SCII takes differences in social conditioning into account. If a male says he likes, "Adjusting a carburetor," he is conforming with a sexual stereotype. On the other hand, if a female says she likes this type of activity, she is rejecting a sexual stereotype, an act which may reflect greater commitment on her part to pursue this type of activity. For example, Goldman, Kaplan and Platt (1973) have shown that female students do not need to express as many mechanical interests as males to be enrolled in a science major. Such distinctions are built into the SCII scales by the use of separate occupational criterion groups and reference samples for men and women. If an occupational scale established for one sex is used for the other sex, the results will be particularly misleading when the scale contains a large number of items preferred by one sex only.

CONCLUSIONS AND RECOMMENDATIONS

The data indicate that the male and female occupational scales for the same occupation should not be regarded as equivalent scales. The correlation coefficients between the matched scales were only moderately high. Furthermore, most of the mean scores for the same-named scales differed substantially for both men and women. Such discrepancies may be easily misinterpreted.

What can be done about this confusing state of affairs? As a first step, it is essential that separate norms for men and women be used in interpreting the scores on

the occupational scales (Creaser and Carsello, 1976). Preferably, this information should be available on the profile sheet itself. Separate bars for each scale that portray the middle-third of scores for both men-in-general and women-in-general (similar to the type of information formerly provided on the SVIB profiles for men and women) would help clarify the results.

The relative validity of the male and female occupational scales needs to be investigated. Whitton (1975) observed that high scores on the cross-sex scales yielded as many "hits" as high scores on the same-sex scales in identifying the career plans of college students. Unfortunately, she failed to control for spuriously high scores on the cross-sex scales by not also considering the number of "misses" associated with high scores on each type of scale. Additional research on this topic is needed. Such research may be pursued readily now that the separate forms of the SCII have been merged.

It may be advisable to revise the scale construction techniques to avoid some of the interpretive problems produced by the present procedures. Several possibilities exist. First, the feasibility of developing occupational scales based upon combined sex samples should be studied. Jean Campbell (1976) indicates that separate sex norms, not separate sex scales, should be sufficient to identify occupational interests. Webber and Harmon (Note 1) found that scales based upon combined sex samples were more valid than scales based upon separate sex samples in some cases (female veterinarians and life insurance agents.)

Second, the items selected for use in the interest inventory could be limited to sex-balanced items, i.e., items that preferred equally by men and women. Rayman (1976) has shown that it is possible to develop interest scales based on sexually neutral items that retain the desired characteristics of existing scales. Webber and Harmon (Note 1) found that scales based on sex-balanced items worked better than traditional scales for one occupational group (female veterinarians) but not for three other groups (male veterinarians, male life insurance agents, and female life insurance agents).

Third, the troublesome men- or women-in-general groups could be eliminated so that the scores of individuals are compared directly with the occupational groups. Kuder (1968) has employed this technique in computing lambda correlation coefficients between the item responses of each individual and the average item responses of the male or female members of each occupational criterion group. With this technique, individuals usually obtain lower scores on occupational scales based on the opposite sex (Diamond, 1974).

Perhaps the best safeguard against the misinterpretation of scores on the occupational scales is to place greater reliance on the basic scales (or the new general

occupational theme scales) to identify occupational interest patterns (Cole and Hanson, 1971; Harmon, 1975). Borgen (1972) concluded that the basic scales performed as well as the occupational scales in predicting academic major and career fields. This procedure would require the presentation of the mean basic interest profile for each occupational criterion group together with the basic interest profile for each client. Separate sex norms for the basic interest scales of men and women in each occupation would still be necessary. This type of presentation would focus attention on the basic interest patterns for each occupational group. Most clients can understand the sex differences associated with the basic interests of men or women in an occupation much more easily than they can understand the sex differences embedded in the occupational scales.

REFERENCE NOTE

1. Webber, P.L. and Harmon, L.W. "A Concurrent Validity Study of Single-Sex and Combined-Sex Scales." Paper presented at the meeting of the American Personnel and Guidance Association, New Orleans, April 1974.

REFERENCES

- Association of Measurement and Evaluation in Guidance Commission on Sex Bias in Measurement. "AMEG Commission Report on Sex Bias in Interest Measurement." *Measurement and Evaluation in Guidance* 6 (1973): 171-177.
- Borgen, F. H. "Predicting Career Choices of Able College Men from Occupational and Basic Interest Scales of the Strong Vocational Interest Blank." *Journal of Counseling Psychology* 19 (1972): 202-211.
- Campbell, D. P. *Manual for Strong Vocational Interest Blanks*. Stanford: Stanford University Press, 1966.
- Campbell, D. P. *Handbook for the Strong Vocational Interest Blank*. Stanford: Stanford University Press, 1971.
- Campbell, D. P. *Manual for the Strong-Campbell Interest Inventory*. Stanford: Stanford University Press, 1974.
- Campbell, J. "Differential Response for Female and Male Law Students on the Strong-Campbell Interest Inventory: The Question of Separate Sex Norms." *Journal of Counseling Psychology*, 23 (1976): 130-135.
- Cole, N. S., and Hanson, G. R. "An Analysis of the Structure of Vocational Interests." *Journal of Counseling Psychology* 18 (1971): 478-486.
- Creaser, J., and Carcello, C. "Comparability of Cross-Sex Scores in the Strong-Campbell Interest Inventory." *Journal of Counseling Psychology* 23 (1976): 360-364.
- Darley, J. G., and Hagenah, T. *Vocational Interest Measurement*. Minneapolis: University of Minnesota Press, 1955.
- Diamond, E. E. *Handling Sex Bias in Kuder Occupational Interest Survey, Form DD: Some Questions and Answers*. Chicago: Science Research Associates, 1974.
- Goldman, R. D., Kaplan, R. M., and Platt, B. B. "Sex Differences in the Relationship of Attitudes Toward Technology to Choice of Field of Study." *Journal of Counseling Psychology* 20 (1973): 412-418.
- Harmon, L. W. "Technical Aspects: Problems of Scale Development, Norms, Item Differences by Sex, and the Rate of Change in Occupational Group Characteristics." In E. E. Diamond, Editor, *Issues of Sex Bias and Sex-Fairness in Career Interest Measurement*. Washington: National Institute of Education, 1975.
- Hornaday, J. A., and Kuder, F. G. "A Study of Male Occupational Interest Scales Applied to Women." *Educational and Psychological Measurement* 21 (1961): 859-864.
- Johansson, C. B., and Harmon, L. W. "Strong Vocational Interest Blank: One Form or Two?" *Journal of Counseling Psychology* 19 (1972): 404-410.
- Kuder, G. F. *Kuder Occupational Interest Survey General Manual (Form DD)*. Chicago: Science Research Associates, 1968.
- Laime, B. F., and Zytowski, D. G. "Women's Scores on the M and F Forms of the SVIB." *Vocational Guidance Quarterly* 12 (1963): 116-118.
- Lunneborg, P. W. "Interpreting Other-Sex Scores on the Strong-Campbell Interest Inventory." *Journal of Counseling Psychology* 22 (1975): 494-499.
- Munley, P. H., Fretz, B. R., and Mills, D. H. "Female College Students' Scores on the Men's and Women's Strong Vocational Interest Blanks." *Journal of Counseling Psychology* 20 (1973): 285-289.
- National Institute of Education. *Guidelines for assessment of Sex Bias and Sex-Fairness in Career Interest Inventories*. Washington: 1974.
- Rayman, J. R. "Sex and the Single Interest Inventory: The Empirical Validation of Sex-Balanced Interest Inventory Items." *Journal of Counseling Psychology* 23 (1976): 239-246.
- Schlossberg, N., and Goodman, J. "Imperative for Change: Counselor Use of the Strong Vocational Interest Blanks." *Impact* 2 (1972): 25-29.
- Seder, M. "Vocational Interests of Professional Women: Part 1." *Journal of Applied Psychology* 24 (1940): 130-143.
- Seder, M. "Vocational Interests of Professional Women: Part 2." *Journal of Applied Psychology* 24 (1940): 265-272.
- Stanfiel, J. D. "Administration of the SVIB Men's Form to Women Counselees." *Vocational Guidance Quarterly* 19 (1970): 22-27.
- Strong, E. K., Jr. *Vocational Interests of Men and Women*. Stanford: Stanford University Press, 1943.
- Whitton, M. C. "Same-Sex and Cross-Sex Reliability and Concurrent Validity of Strong-Campbell Interest Inventory." *Journal of Counseling Psychology* 22 (1975): 204-210.

C. INTERESTS OF SPECIAL GROUPS

On Measuring the Vocational Interests of Women*

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Abstract. Analyses of the interrelationships of scales on common interest inventories and of the interest patterns of women selecting various occupations support the similarity of the structure of women's interests

to the structure previously found for men. This information should be used to provide women with information about more and more diverse career options than are now commonly available.

The application of civil rights laws to discrimination against women in hiring practices and in salary levels, the public attention gained by the women's liberation movement and the increasing number of women who enter the work force each year seem to be combining to produce a large number of women with access to a greatly increasing variety of careers. Vocational interests inventories that often have been constructed primarily for use with men are used commonly to assist women in making career decisions. However, the investigation of such use necessarily has been limited to the occupations that women have entered in great numbers, traditional women's occupations. The appropriateness of present inventories for use with women who have access to the whole range of occupations should be examined carefully.

Research has suggested that present inventories yield much meaningful information about women's vocational interests. A number of studies have reported similar differences between career-oriented and home-oriented women (Astin, 1968; Gysbers, Johnston, & Gust, 1968; Harmon, 1970; Hoyt and Kennedy, 1958; Rand, 1968; Schissel, 1968; Surette, 1967; Wagmen, 1966). Astin (1968) and Harmon (1970) have studied the development of vocational interests in women using standard inventories, and Harmon (1969) examined the long-term stability of interest measures for women. Many occupational scales for women have been validated (e.g., Campbell and Soliman, 1968; Darly and Hagenah, 1955; Harmon and Campbell, 1968; Strong, 1943). Much useful information about women's vocational interests is provided by present inventories.

However, a number of questions remain about the use of present inventories with women considering vocations not traditionally associated with women. When the results of inventories center around women's occupational

scales that have been limited to traditional women's occupations, students and counselors may limit consideration to the occupations presented, although, in fact, the options may be much broader. If the patterns and interrelationships of women's interests are similar to those for men, inferences may be possible from data for women to the entire range of men's occupations, thus eliminating the limiting effect of using only the traditional women's vocations. The purpose of this paper is to consider this possibility by examining the structure of women's interests in terms of inventory scales and occupational groups, to compare this structure with that for men, and finally, to suggest what inferences can be made from women's interests to the entire career spectrum.

STUDY 1: STRUCTURE OF WOMEN'S INTERESTS

In a recent article, Cole and Hanson (1971) examined the structure of vocational interests of men in several interest inventories. Their results indicated a common structure (or pattern of interrelationships) of interests across all the inventories considered. The common structure followed the two-dimensional circular arrangement of scales proposed by Roe (1956) and Holland, Whitney, Cole and Richards (1969). In Holland's terms, the circular arrangement is from Realistic to Intellectual to Artistic to Social to Enterprising to Conventional and back to Realistic.

Cole and Hanson (1971) suggested that knowledge of such a circular arrangement could assist in the interpretation of the inventories, particularly with occupations for which no specific scales exist. In the case of women, useful interpretation in the absence of particular occupational scales could be useful in this time of vocational transition. Therefore, the purpose of the first study was to examine the structure of women's interests in the

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Strong Vocational Interest Blank, the Kuder Occupational Interest Survey, Holland's Vocational Preference Inventory, and the American College Testing (ACT) Vocational Interest Profile to discover if a common structure existed and, if so, to explore how it compared with that for men.

Method

The analysis of spatial configuration. Following Cole and Hanson (1971), an analysis of spatial configuration (Cole and Cole, 1970) was used to examine the relationship of scales for women in the four inventories, the Strong, the Kuder, Holland's inventory, and the ACT instrument. The analysis gave (a) the degree to which the variation on the scales can be accounted for by a two-dimensional configuration of the scales and (b) the particular configuration of the scales and (b) the particular configuration of the interest scales when plotted on a two-dimensional surface.

Data. Separate correlation matrices of the scales in each of the interest inventories were submitted to the analysis described. The intercorrelations of 27 Strong Occupational scales for 300 women were given in Strong (1959), and those for 19 Strong Basic scales for women were taken from Campbell (1971, p. 168). The *Kuder Occupational Interest Survey Manual* (Kuder, 1966, pp. 56-57) gave intercorrelations of 21 core scales for 280 women. The intercorrelations of the six Holland scales for 2,433 women were reported in the *ACT Guidance Profile Manual* (American College Testing Program, 1968) and those for the 8 scales of the ACT inventory for 655 women were given in the *Handbook for the ACT Career Planning Program* (American College Testing Program, 1972).

The Kuder inventory posed a special problem as the 21 core scales on which data were reported for women included 14 scales constructed on men but scored for women along with 7 scales constructed on women. In addition, of the 14 men's scales, there were 9 occupational groups and 5 groups of educational majors, while 2 of the 7 women's scales also were traditional women's

occupational areas, primarily of the social type that would be expected to give only a small segment of the Holland circle. Because of this unusual mix of scales and because comparisons across scales derived on different sex groups is not recommended on the Kuder, only the nine male-constructed Occupational scales were analyzed. These scales seemed most likely to show any whole circle configuration that might exist.

Results

Goodness of fit of the two dimensions. The goodness of fit of a planar surface to the points representing scales of an inventory was measured by the percentage of the trace given by the first two dimensions in the analysis of spatial configuration. The percentage of the trace may be interpreted as the proportion of the variance of the scale points accounted for by two dimensions.

Table 1 presents the results for the fit of the plane for each of the five analyses. The results were comparable to those found with men by Cole and Hanson (1971), in each case. Four of the five analyses indicated a good fit of the scale configuration to the plane with percentages of the trace near 60 percent. The Strong Basic scales give a much poorer fit (as occurred with men) as was expected since the scales were constructed to be as independent as possible.

Planar configurations. The scale points were projected onto the best-fitting planar surface for each of the inventories, and the configurations were oriented in the same general way for visual comparisons. Figure 1 gives the configuration of Holland's six scales. The configuration corresponded to that reported by Holland et al. (1969)

TABLE 1

Goodness of Fit of the Planes

Number of scales	Inventory	Percentage trace
27	Strong Occupational scales	59.0
19	Strong Basic scales	34.3
9	Kuder Occupational scales	61.7
6	Holland's VPI scales	59.7
8	ACT VIP scales	59.5

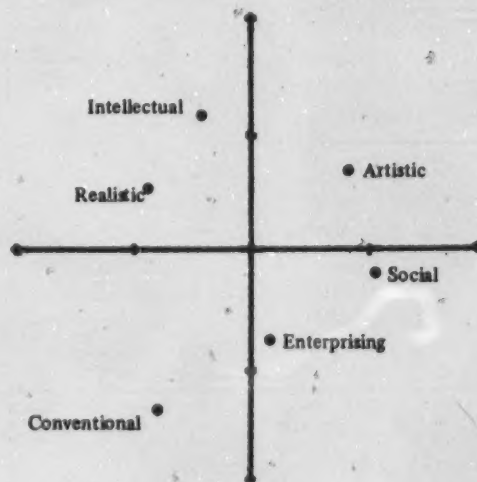


FIG. 1. Spatial configuration for women of Holland's six Vocational Preference Inventory scales.

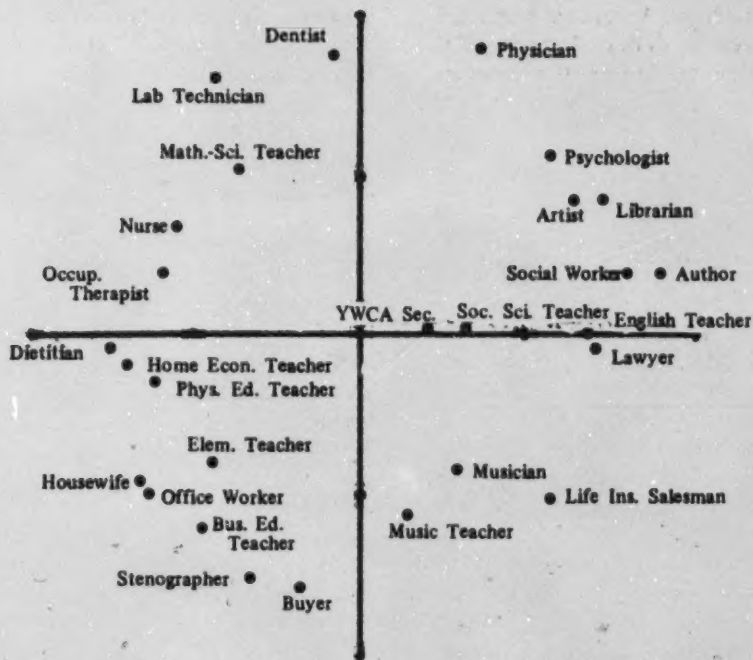


FIG. 2. Spatial configuration for women of 27 Strong Vocational Interest Blank Occupational scales.

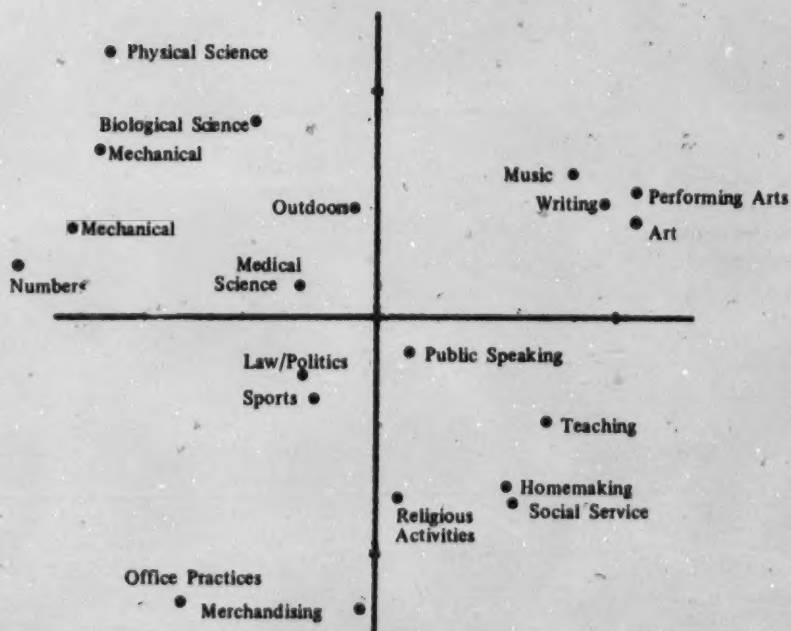


FIG. 3. Spatial configuration for women of 19 SVIB Basic scales.

and Edwards and Whitney (1971) and showed the circular ordering from Realistic to Intellectual to Artistic to Social to Enterprising to Conventional.

The configurations of the 27 Strong Occupational scales, the 19 Strong Basic scales, the 9 Kuder scales, and the 8 ACT scales are given in Figures 2, 3, 4, and 5, respectively. In each case the configurations tended to follow the Holland ordering and were, in addition, similar to the comparable configurations for men reported in Cole and Hanson (1971). For example, of the Strong Occupational scales in Figure 2, math-science teacher, dentist, physician, psychologist, author, life insurance salesman, and office worker were located in positions similar to the corresponding scales for men (Cole and Hanson, 1971, p. 481); and in both cases, the scales conformed to the Holland circular ordering. For each inventory examined, the Realistic and Intellectual scales tended to be found in the upper left quadrant, the Artistic scales to the upper right, and the Social, Enterprising, and Conventional scales from right to left in the lower half of the configuration.

Discussion

In this study we found that women's interests can be represented in a two-dimensional configuration and that the configurations generally conform to those reported by Cole and Hanson (1971) for men. The existence of a structure in the interests of women similar to that found for men could be valuable in interpreting women's interests, especially in cases where specific scales for women in careers dominated by men are unavailable.

In Study 2, we examined interest inventory scores of

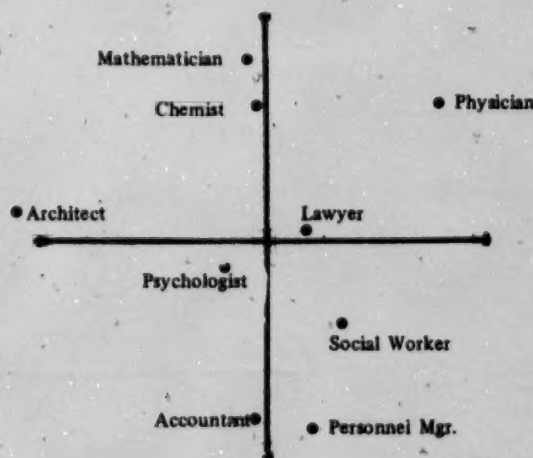


FIG. 4 Spatial configuration for women of nine Kuder Occupational Interest Survey scales.

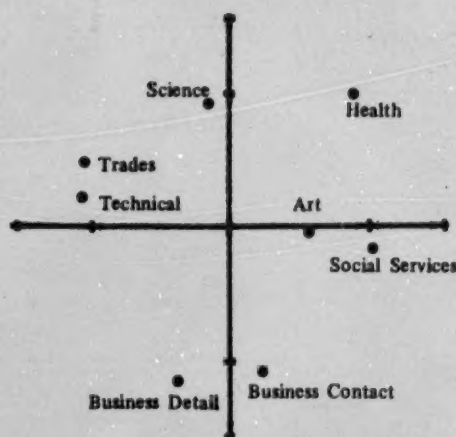


FIG. 5. Spatial configuration for women of eight American College Testing Vocational Interest Profile scales.

women selecting particular vocations to get further information about the pervasiveness of the Holland configuration in the vocational interests of women.

STUDY 2: OCCUPATIONAL CONFIGURATIONS

Additional information about the interest patterns of women in a variety of occupations can be obtained by constructing occupational configurations. Cole, Whitney, and Holland (1971) used the analysis of spatial configuration to construct a configuration of occupations for men based on Holland's VPI. The results both confirmed and supplemented the analyses of Cole and Hanson (1971). In this study, we constructed two occupational configurations for women—one based on the ACT VIP—in order to compare the occupational configurations and to gain additional information about occupational groups for which no scales are available.

Method

Data. The data for one of the occupational configurations were scores on the six scales of Holland's VPI and expressed vocational choice of 6,143 female college freshmen in a sample described by Abe, Holland, Lutz, and Richards (1965). Expressed vocational choice was obtained by asking the students to select from a list of over 70 occupations "the occupation you plan to enter." Mean VPI scores were computed for all students selecting each of 22 occupations with adequate frequency of

selection and expected diversity in the configuration.

For the second occupational configuration, the data were scores on the eight scales of the ACT VIP and expressed vocational choice for women entering 2-year colleges. The students selected their vocational choices from a list of over 150 occupations. Mean ACT VIP scores were computed for students selecting each of 13 occupations.

Analysis. Cole and Cole (1970) described a procedure for projecting group means onto the space of the variables produced from the analysis of spatial configuration described in Study 1. The analysis yields a projection matrix with which the occupational group means can be plotted on the same surface as the scale configuration. The result is then a configuration of occupational

groups. This procedure was used by Cole et al. (1971) to obtain an occupational configuration for men based on scores on Holland's VPI. In this study the analysis was applied to data for women from Holland's inventory and from the ACT VIP to obtain two occupational configurations for women.

Results

Figure 6 gives the occupational map for 22 women's vocational choice groups based on Holland's VPI. The map in Figure 6 can be superimposed on that of the Holland scales in Figure 1 to relate the inventory scales and the occupational groups. The configuration in Figure 6 was compatible with the scale configuration in Fig-

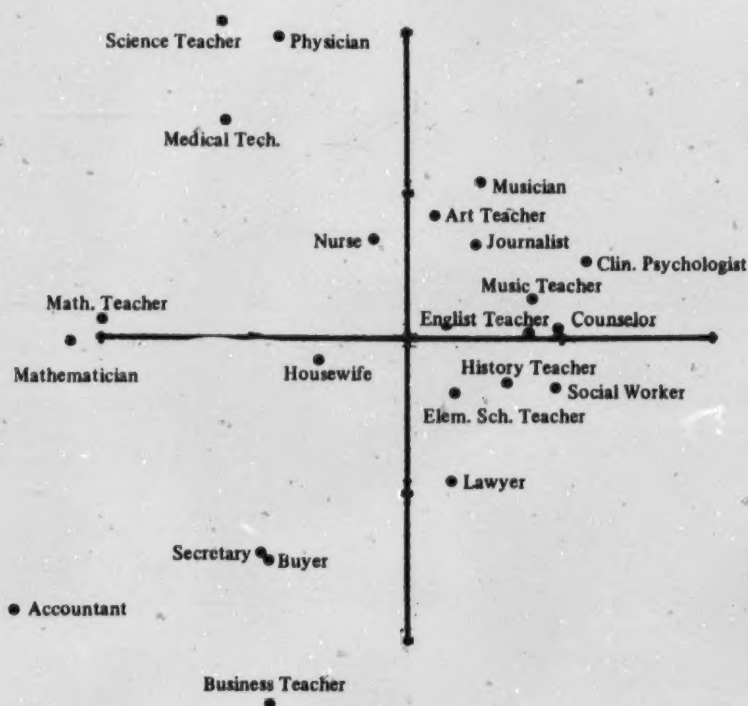


FIG. 6. Spatial configuration of occupations based on women's responses to Holland's Vocational Preference Inventory. (The number in each occupational group is given below.)

Accountant-174
Art Teacher-93
Business Teacher-89
Buyer-55
Clinical Psychologist-48
Counselor-76
Elementary School Teacher-1497
English Teacher-306
History Teacher-154
Housewife-122
Journalist-57

Lawyer-32
Mathematician-54
Math. Teach-114
Medical Technician-111
Musician-43
Music Teacher-74
Nurse-301
Physician-79
Science Teacher-45
Secretary-267
Social Worker-140

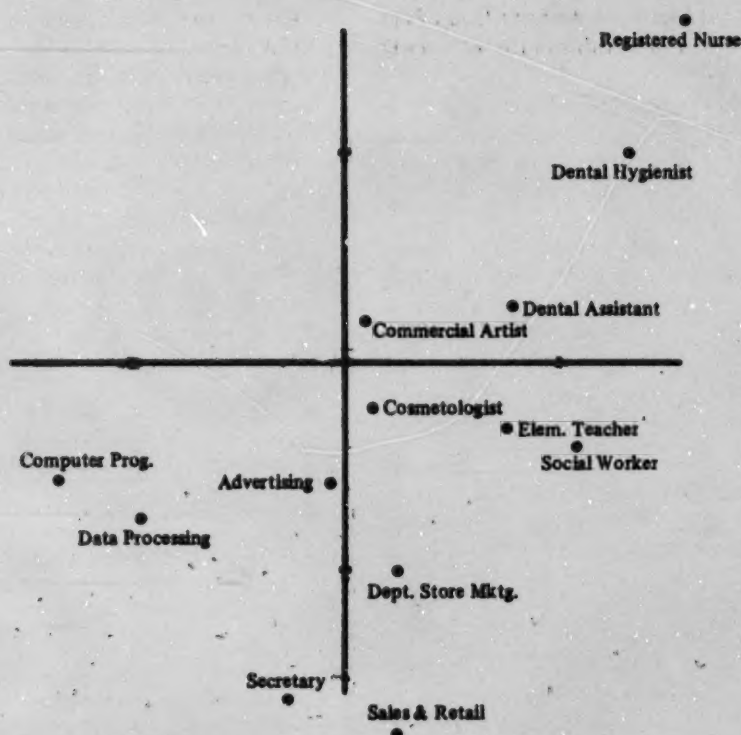


FIG. 7. Spatial configuration of occupations based on women's responses to the ACT Vocational Interest Profile. (The number in each occupational group is given below.)

Advertising-20
Commercial Artist-38
Computer Programmer-178
Cosmetologist-158
Data Processing-231
Dental Assistant-313
Dental Hygienist-129

Department Store Marketing-22
Elementary School Teacher-89
Registered Nurse-843
Sales & Retail-79
Secretary-988
Social Worker-58

ure 1; that is, social-type occupations such as social worker, elementary school teacher, history teacher, and counselor fell in the same area as the Social scale. In addition, the configuration of occupations was similar to that found for men by Cole et al. (1971).

In Figure 7, the configuration is given for 13 occupational choice groups based on the ACT VIP scores of a sample of women entering 2-year colleges. No scientific occupations were available on this group and therefore the upper left quadrant is vacant. However, even on this different sample of women, the occupations again conformed to the scale configuration in Figure 4 and to the general Holland circular ordering.

Discussion

The similarities of the occupational configurations

based on two samples of women (one sample of 4-year college students and another of 2-year college students) and two different inventories lend further support for the pervasiveness of the Holland circular ordering in the vocational interests of women.

IMPLICATIONS AND CONCLUSIONS

The primary concern of this article has been to determine how interest inventories can be used with women in order to provide useful information about the full range of careers currently being opened to them. As was noted earlier, the use of traditional women's occupational scales may have a severely limiting effect on the careers women consider. Yet at this time of transition, the only data available are those on traditional women's occupations. In this section we examine the implications

of the studies presented here for a different kind of use of present interest inventories with women with newly increased career options.

The two studies in this article indicated that when women's interests were compared with those of other women, the resulting structure of interests was essentially the same as that found for men. In addition, when there were occupations that both men and women pursue, these occupations tended to fit in similar positions within the structure for both men and women. These results suggested that by locating a woman's interests within the observed circular structure, one could indicate similarities not only with the locations of women's occupations but also with men's occupations at a corresponding location in the structure for men.

The Holland VPI and the ACT VIP are well suited to this approach since they contain scales that refer to areas of the circular structure and are identical for men and women. Thus, on these two inventories one need only identify the scales on which a woman's scores are relatively high when compared with scores of other women, and refer the woman to both the men's and women's occupations that relate to those scales.

The same type of information also is available in the Strong and in the Kuder, although in a less direct way. For these two inventories, the present scales should be used *only* to locate a woman's interests on the circular structure or in the primary categories of the structure. Then lists of both men's and women's occupations that relate to that location should be provided. On the Strong, either the women's Occupational scales, the women's Basic scales, or the new Strong-Holland scales could be used at the initial step. The women's Occupational scales on the Kuder are so limited that the male-derived scales are probably better suited for the purpose of locating women's interests on the circular structure.

Two additional implications should be mentioned. First, the procedures suggested here are different from the tradition of empirical group comparison common to both the Strong and the Kuder (although not inconsistent with the more recent work on the more general Strong Basic scales). We do not necessarily argue against the empirical approach but the lack of available data should not be used to limit women's career options, especially when a viable alternative exists. A second point deserving notice is that the results of the studies presented here do not imply that women's and men's interests do not differ. In fact, there is abundant evidence that distinct differences do exist in present society. The results implied instead that the interrelationships of interests do not differ and, for example, that a woman whose interests are relatively more scientific than those of other women may look more like a scientist in her

interest pattern even though she may still have the high social interests of most women.

In summary, while present interest inventories sometimes include traditional women's occupational scales that could limit women's career options, the present inventories show a common structure of women's interests that parallels that found for men. By using this structure, women may be given information about how their interests relate to the full spectrum of occupations, including those associated traditionally with either men or women.

REFERENCES

- Abe, C., Holland, J. L., Lutz, S. W., and Richards, J. M., Jr. "A Description of American College Freshmen." *ACT Research Report No. 1*. Iowa City: American College Testing Program, 1965.
- American College Testing Program. *ACT Guidance Profile Manual*. Iowa City: Author, 1968.
- American College Testing Program. *Handbook for the ACT Career Planning Program*. Iowa City: Author, 1972.
- Astin, H. S. "Career Development of Girls During the High School Years." *Journal of Counseling Psychology* 15 (1968): 536-540.
- Campbell, D. P. *Manual for the Strong Vocational Interest Blank*. Stanford: Stanford University Press, 1966.
- Campbell, D. P. *Handbook for the Strong Vocational Interest Blank*. Stanford: Stanford University Press, 1971.
- Campbell, D. P., and Soliman, A. M. "The Vocational Interests of Women in Psychology: 1942-66." *American Psychologist* 1 (1971): 1-9.
- Cole, N. S., and Cole, J. W. L. "An Analysis of Spatial Configuration and Its Application to Research in Higher Education." *ACT Research Report No. 35*. Iowa City: American College Testing Program, 1970.
- Cole, N. S., and Hanson, G. R. "An Analysis of the Structure of Vocational Interests." *Journal of Counseling Psychology* 18 (1971): 478-486.
- Cole, N. S., Whitney, D. R., and Holland, J. L. "A Spatial Configuration of Occupations." *Journal of Vocational Behavior*, 1 (1971): 1-9.
- Darley, J. G., and Hagenah, T. *Vocational Interest Measurement: Theory and Practice*. Minneapolis: University of Minnesota Press, 1955.
- Edwards, K. J., and Whitney, D. R. *A Structural Analysis of Holland's Personality Types Using Factor and Configural Analysis*. (Center for Social Organization of Schools Research. Reprint No. 103) Baltimore: Johns Hopkins University, 1971.
- Gysbers, N. C., Johnston, J. A., and Gust, T. "Characteristics of Homemaker- and Career-Oriented Women." *Journal of Counseling Psychology*, 15 (1968): 541-546.
- Harmon, L. W. "Predictive Power Over 10 Years of Measured Social Service and Scientific Interests Among College Women." *Journal of Applied Psychology* 53 (1969): 193-198.
- Harmon, L. W. "Anatomy of Career Commitment in Women." *Journal of Counseling Psychology* 17 (1970): 77-80.
- Harmon, L. W., and Campbell, D. P. "Use of Interest Inventories with Nonprofessional Women: Stewardesses versus Dental Assistants." *Journal of Counseling Psychology* 15 (1968): 17-22.

- Holland, J. L. *Manual for the Vocational Preference Inventory*. (6th rev.) Palo Alto: Consulting Psychologists Press, 1965.
- Holland, J. L., Whitney, D. R., Cole, N. S., and Richards, J. M., Jr. "An Empirical Occupational Classification Derived from a Theory of Personality and Intended for Practice and Research." *ACT Research Report No. 29*. Iowa City: American College Testing Program, 1969.
- Hoyt, D. P., and Kennedy, C. E. "Interest and Personality Correlates of Career-Motivated and Homemaking-Motivated College Women." *Journal of Counseling Psychology* 5 (1958): 44-58.
- Kuder, G. F. *Kuder Occupational Interest Survey General Manual*. Chicago: Science Research Associates, 1966.
- Rand, L. "Masculinity or Femininity? Differentiating Career-Oriented and Homemaking Oriented College Freshman Women." *Journal of Counseling Psychology* 15 (1968): 444-450.
- Roe, A. *The Psychology of Occupations*. New York: Wiley, 1956.
- Schissel, R. F. "Development of a Career-Orientation Scale for Women." *Journal of Counseling Psychology* 15 (1968): 257-262.
- Strong, E. K., Jr. *Vocational Interests of Men and Women*. Stanford: Stanford University Press, 1943.
- Strong, E. K., Jr. *Strong Vocational Interest Blank Manual*. Palo Alto: Consulting Psychologists Press, 1959.
- Surstte, R. F. "Career versus Homemaking: Perspectives and Proposals." *Vocational Guidance Quarterly* 16 (1967): 82-86.
- Wagman, M. "Interests and Values of Career and Homemaking Oriented Women." *Personnel and Guidance Journal* 44 (1966): 794-801.

Validity of the ACT Interest Inventory for Minority Group Members

By

Richard R. Lamb

Abstract. How appropriate is the ACT Interest Inventory for use with minority group members? Data from 2,280 college seniors (1,237 males and 1,043 females) representing black, native American, oriental American, Spanish-surnamed American and white ethnic groups were analyzed to determine whether the ACT Interest Inventory could classify minority group students as accurately as white students into appropriate educational major groups. In addition, the structure of measured

interests, as indicated by the intercorrelations of the six ACT Interest Inventory scales, was compared across the white and minority samples. For most minority groups, the percentage of clean hits was as high as or higher than the percentage for the white sample. With one exception, native American males, the interest structure was also highly similar for white and minority samples. These data suggest the ACT Interest Inventory is appropriate for use with minority group members.

Minority youth seeking higher education are among those who might profit from the use of interest inventories. *Compared with their white peers, they are less likely to have had significant exposure to adults in professional level occupations. Their secondary school background is less likely to have emphasized planning for careers which require college training. Thus, the self-awareness and career suggestions gained from inventory results could be particularly important to these young persons.

It is not clear, however, that interest inventories yield useful results for minority groups. Inventories currently in use have been developed and validated using samples composed primarily of white, middle-class Americans. Conceivably, interest inventory results for individuals with different cultural and socioeconomic backgrounds may not have the same meaning. Thus, one may logically question the appropriateness of using interest inventories with minority groups.

Unfortunately, in contrast to the voluminous research on the appropriateness of using aptitude measures with minority groups, there has been little research on this topic. The few available studies typically focus on black males. Early research reported by E. K. Strong (1943, 1952, 1955) provided preliminary support for the usefulness of interest inventories with black populations. The interests of black college students in nursing and medicine and of black lawyers and life insurance agents were found to be similar to those of their white counterparts. Black and white male physicians did not have simi-

lar interests, however. Recent research with black males supports Strong's findings. Borgen and Harper (1973) compared the predictive validity of the SVIB for a sample of 79 black National Achievement Scholarship winners and 780 white National Merit Scholarship winners. These college seniors had taken the SVIB as entering freshmen. The ability of the SVIB to predict career choice was compared for the black and white samples. Little difference in criterion-related validity was found for the two samples.

Similar findings were reported by Whetstone and Hayles (1975). Concurrent validity of the SVIB was compared for 69 black and 123 white college men by comparing the appropriateness of the interest profile with selected college major. Judgments of consistency were made for the occupational and basic scales, using primary patterns only, and primary and secondary patterns combined. Differences between the black and white samples were small.

Previous research has usually involved criterion-related evidence for only one or two minority groups, usually black males. One limitation of this type of research is that evaluation is dependent upon the particular minority groups and occupational fields studied. Interest measures may be inaccurate for certain groups or fields, but such inaccuracies may not be detected if these fields or groups are not included in the analysis. Determination of the structure of measured interests for various cultural groups is an alternative approach to establishing the appropriate uses and interpretations of interest scores. Additionally, the results from such an analysis should generalize more readily to other inventories. That is, if the structure of interests is different for a certain minority, then one could question the appropriateness of assessing similar interest dimensions with other interest inventories.

The purpose of this study was to obtain additional

* This research was completed as a doctoral thesis while the author was a graduate student at the University of Iowa and a research assistant at the American College Testing Program. The author wishes to thank Dr. Gary Hanson and Dr. Dale Prediger, both of ACT, for their editorial assistance in the preparation of the manuscript, and Ms. Jane Bock of ACT for typing the manuscript.

white college seniors and college seniors in each of four minority groups: black, native American, Spanish-surnamed American, and oriental American. Second, the interest structures, as indicated by scale intercorrelations, were compared for whites and the four minority groups. Both analyses were conducted separately by sex.

METHOD

Instrument

The instrument used was the ACT Interest Inventory, which is part of the ACT Assessment Program (Hanson, 1974). The ACT Interest Inventory provides scores on six basic interest scales which correspond closely to the six-scale format developed by Holland (1966; 1973). These scales (and the corresponding Holland types) are: Technical (Realistic), Science (Investigative), Creative Arts (Artistic), Social Service (Social), Business Contact (Enterprising), and Business Detail (Conventional).

In addition to the actual scores on these six scales, an individual's score report includes the coordinates of his or her profile point on an interest map showing point locations, or centroids, for college seniors in 24 different academic majors. The locations of the 24 majors in the validation sample were determined by multiple discriminant analysis; the first two discriminant functions form the x and y axes (Hanson, 1974).

Sample

The sample consisted of college seniors surveyed in the spring of 1973 in conjunction with the validation of the ACT Interest Inventory (Hanson, 1974). The students in the mail survey were majoring in 24 preselected areas at 32 colleges and universities selected as a representative nationally with respect to geographic region, size, and type of control (public vs. private). The ACT Interest Inventory and a questionnaire which included items on race, sex, and college major were available for each student.

As part of the ACT Interest Inventory validation procedure, the sample was divided into two subsamples—a validation sample ($N = 12,109$) and a cross-validation sample ($N = 1,534$). Details are provided by Hanson (1974). Data for white students in these comparisons were obtained from the cross validation sample. Data for minority students were selected from the validation sample, however, because there were not enough minority students in the cross-validation sample to perform the analysis. Although it clearly would have been inappropriate to have selected white students from the validation sample, because the formula for predicting college major

(Hanson, 1974) was derived using essentially the same students, use of minority data from this sample can be defended. Each of the minority groups constituted but a very small proportion of the validation sample. Of the 12,109 students in the validation sample, 365 were black, 65 were native American, 310 were Spanish-surnamed, and 203 were oriental American. Hence, the influence of data from any minority group on the prediction formula was negligible.

Procedure

Criterion-related validity comparisons. The first step in the procedure was to compute for each subject the distance between each of the 24 college majors and the student's own location on the two interest dimensions that best differentiated the groups. By listing majors in order of least to greatest distance, a ranking of majors from greatest to least similarity to the subject's location was obtained.

Next, each of the majors in this ordered list, and the subject's reported major, were converted to one of four fields of study: business, science, humanities, or fine arts. Academic major was converted to field of study according to the classification format in Table 1. An academic major was included in a field of study based on: (1) closeness of the academic major centroids as plotted on the two interest dimensions, (2) the formation of educationally meaningful categories, (3) the achievement of adequate sample sizes in the categories selected.

TABLE 1

Classification of Academic Majors as to Field of Study

Field	Majors Included	
Business	Accounting Business Business Education	Marketing Agriculture Economics
Science	Mathematics Engineering Physical Sciences	Biological Sciences Health Fields
Humanities	Home Economics Foreign Language Political Science Psychology Elementary Education	Philosophy & Religion History Sociology Social Sciences
Fine Arts	English & Literature Music Education	Art Education Art

Ability of the ACT Interest Inventory to classify each student correctly as to field of study was then determined. If a student's own field was the field predicted by the ACT Interest Inventory, classification was termed a hit. If the actual field of study was the last field in the ordered list of those four predicted by the ACT Interest Inventory, classification was termed a clean miss. Finally, the proportions of hits and of clean misses for each of the minority groups were compared with those for the white students in the cross-validation sample. These comparisons were made separately by sex, both within each field of study and for the total samples.

Comparisons of interest structure. In the second method of analysis, the interest structures, as indicated by the intercorrelation matrices of the six ACT Interest Inventory scales assessing Holland types, were compared for white students and students in each of the five minority groups. Validation sample data were used for all minority group analyses. Validation and cross-validation data were used for analyses on white samples. If one or more of the ACT Interest Inventory scales have a different meaning for a minority group, then a different scale structure may be expected. Similar scale structure across groups would suggest similar meaning.

The analysis of spatial configuration developed by Cole and Cole (1970) was used to portray intercorrelations in order to facilitate meaningful comparisons. This analysis provides a two-dimensional representation of any intercorrelation matrix and has been used as a method of analysis of the structure of vocational interests among various white populations (Cole and Hanson, 1971; Cole, Whitney and Holland, 1971; Cole, 1973; Hanson, Lamb and English, 1974). When Holland-type scales are used, this analysis has generally demonstrated a circular ordering of the scale points consistent with the ordered relationship suggested by Holland in his theory of vocational choice (Holland, 1973). This order, in Holland terminology, is as follows: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional; Realistic completes the circular order. The analysis of spatial configuration was also performed for white subjects in the cross-validation sample, thereby providing a comparison with white subjects in the validation sample.

RESULTS

Criterion-related Validity Comparisons

Comparisons of the white and minority male samples by field of study on percentages of hits and clean misses are presented in Table 2. In general, the percentage of hits for the minority samples did not differ by more than a few percentage points from the percentage for the white samples for any field of study. The only striking

exception was in the fine arts field for black and Spanish-surnamed students, in which 25 percent and 23 percent were correctly classified, compared with 53 percent of the white subjects. Similarly, the percentage of clean misses for minority samples was not more than a few points different from that for the white samples, with the exception of blacks in science and the Spanish-surnamed in fine arts. There were insufficient numbers of native American and oriental American males in fine arts to provide meaningful comparisons.

The overall percentages of hits and clean misses for each male minority group are provided at the bottom of Table 2. This summary comparison also suggests only minor differences between the minority and white samples on criterion-related validity. The overall percentage of hits was lowest for the Spanish-surnamed sample (41 percent), but only eight percentage points below the white sample (49 percent). The percentage of clean misses ranged from 10 percent for the native American males to 5 percent for oriental American and white males.

The pattern was similar for the females, as indicated in Table 3. Differences in the two indices of validity for

TABLE 2

Comparison of White and Minority Males on
Percentage of Hits and Percentage of
Clean Misses by Field of Study

	White	Black	Native American	Spanish Surnamed	Oriental American
Business					
% hits	62	79	64	75	70
% clean misses	8	7	14	4	15
N	195	29	14	24	20
Science					
% hits	68	53	54	60	73
% clean misses	5	19	8	8	2
N	196	36	13	48	48
Humanities					
% hits	24	31	23	27	26
% clean misses	0	0	0	0	0
N	265	68	13	96	27
Fine Arts					
% hits	53	25	—	23	—
% clean misses	13	17	—	36	—
N	103	12	—	22	—
Total					
% hits	49	46	45	41	56
% clean misses	5	8	10	7	5
N	759	145	42	190	101

Note. Data based on fewer than ten subjects are not shown.

TABLE 3

Comparison of White and Minority Females on
Percentage of Hits and Percentage of
Clean Misses by Field of Study

	White	Black	Native American	Spanish Surnamed	Oriental American
Business					
% hits	75	87	-	57	68
% clean misses	5	2	-	14	0
N	61	55	-	14	19
Science					
% hits	68	63	-	75	79
% clean misses	7	5	-	3	9
N	109	43	-	32	34
Humanities					
% hits	25	26	-	30	29
% clean misses	0	0	-	0	0
N	302	109	-	66	45
Fine Arts					
% hits	56	54	-	-	-
% clean misses	19	15	-	-	-
N	106	13	-	-	-
Total					
% hits	44	50	61	48	53
% clean misses	5	2	0	4	3
N	578	220	23	120	102

Note. Data based on fewer than ten subjects are not shown.

minority and white samples within each field were small. Overall, the percentage of hits was actually lowest in the white sample, at 44 percent minority sample values for this index ranged from 48 percent to 61 percent. The percentage of clean misses ranged from 2 percent to 5 percent.

The hit rates for the four fields may be affected to some degree by the base rates for these four areas. Since the proportion of subjects in each field was somewhat different for each sample, the expected chance percentage of hits in each field was somewhat different from sample to sample. Similarly, the hit rate for the total sample values was influenced somewhat by the distribution of subjects within the four fields. Ideally, a correction for chance levels of predictions should be applied to the data in Tables 2 and 3, and improvement over chance level of prediction compared between samples. However, an appreciable correction would not have resulted, because the distribution of subjects by field of study was not grossly dissimilar across samples. The simple presentation of data in Tables 2 and 3 thus may be considered to provide reasonably complete comparisons

of ACT Interest Inventory Criterion-related validity across the samples.

Interest Structure Comparisons

The results of the analysis of spatial configuration are shown in Figure 1 for the males and in Figure 2 for the females. Scale points representing each of the six Holland categories are labeled only with the first letter of the corresponding Holland category (e.g., "R" for realistic).

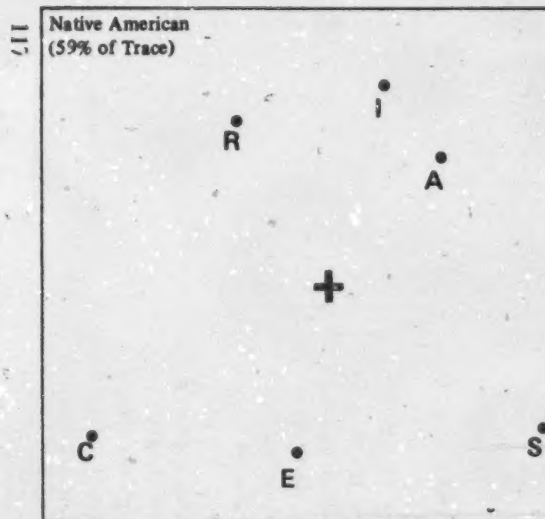
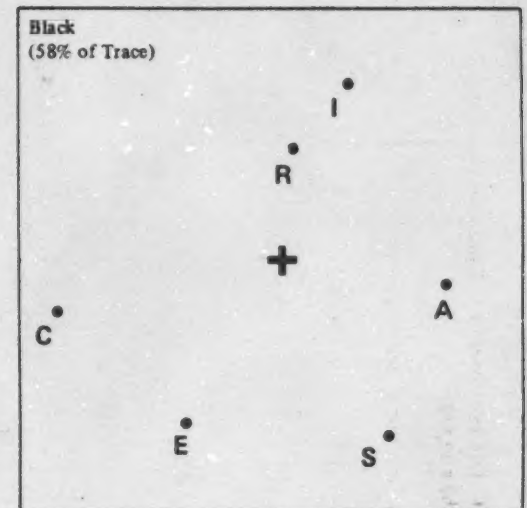
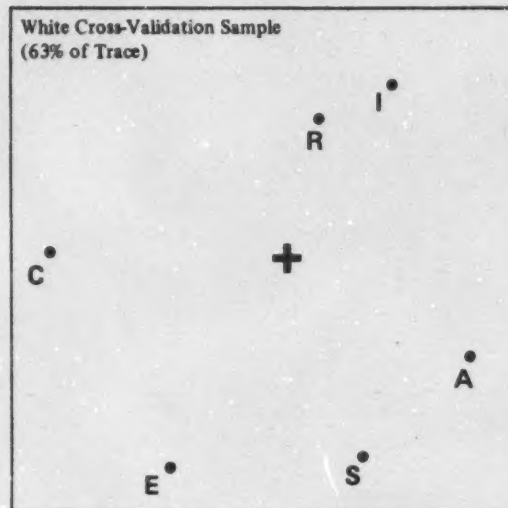
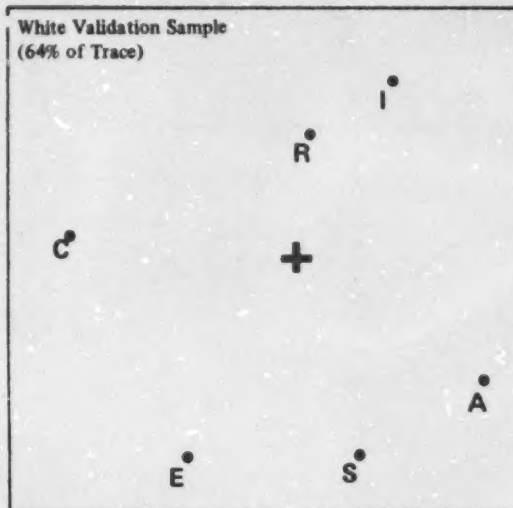
The extent to which each plot is representative of its corresponding intercorrelation matrix is noted on the plot as "percentage of trace." This value can be interpreted as the percentage of the variance of the scale loadings in n -dimensional multivariate space accounted for by the two dimensions plotted (Cole and Cole, 1970, p. 3). The range for percent trace for the plots in Figures 1 and 2 was from 54 percent to 68 percent; which is comparable to values reported in previous research using this procedure. Thus, the two-dimensional plots in Figures 1 and 2 can be considered reasonably complete pictures of the intercorrelation matrices they represent.

The configurations for both white males and white females in the validation and cross-validation samples followed the expected circular pattern of scale points according to Holland's model. Within each sex, placement of the scale points was almost identical for the validation and cross-validation samples and thus supported the assumption of equivalency between these samples. With one exception—the native American male sample—the basic interest structure for each of the minority samples generally corresponded to the configuration for the white sample of the same sex. With this one exception, then, the results of this analysis indicate that no minority group differences in scale structure are evident.

The spatial configuration for the native American male sample, based on 42 subjects, differed from the configuration for the white male sample in that the Social scale point was located on the opposite side of the circle, near the center. The position of the Social scales, compared with a correlation of only .12 between these same scales for white males in the validation sample. A high correlation between the Social and Realistic scales is inconsistent with the Holland model, as these scales represent highly divergent personality types. However, these findings for native American males should be regarded with caution because of the limited number of native American males included in this study.

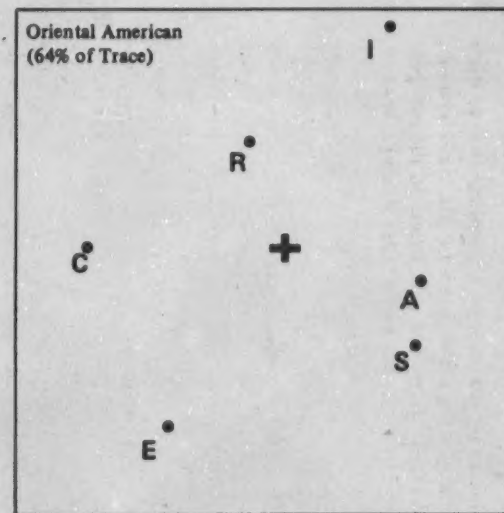
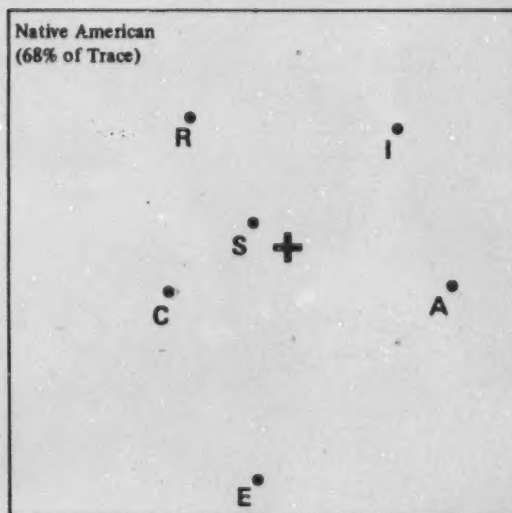
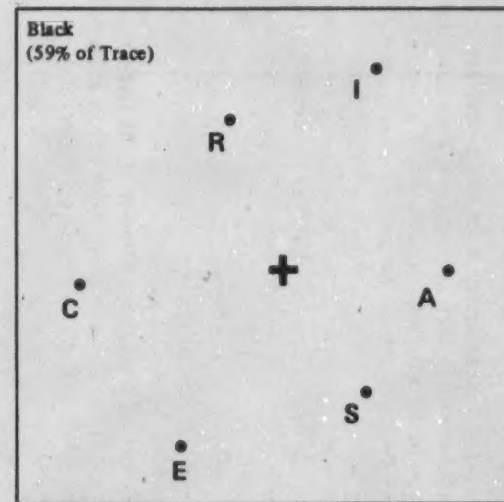
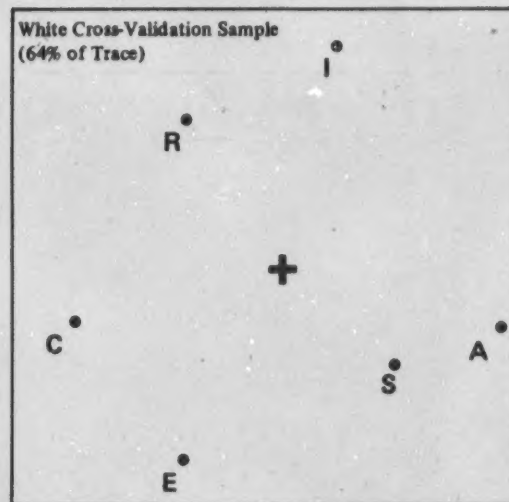
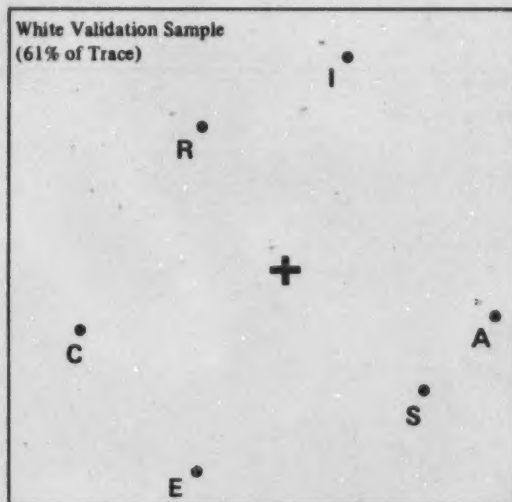
DISCUSSION

The data provide only two suggestions that the ACT



(Female)

Figure 2. Spatial configuration of scales for female samples.



118
123 (Male)

Figure 1. Spatial configuration of scales for male samples.

124

Interest Inventory may not be appropriate for use with some minority groups. The first is for black and Spanish-surnamed males in the fine arts, based on the low percentage of hits for these individuals. Possibly, because of the small number of minority group males in the fine arts, the low hit rate was simply the result of sampling error. Another possibility, reinforced by the finding that the structure of interests for these minority group males was similar to that for white males, is that some males inappropriately chose majors in fine arts, despite their strong interests in other fields. Such a factor would result in a lowered hit rate but would not affect the structure of interests. Whatever the cause of the low percentage of hits, however, the ACT Interest Inventory remains a useful inventory in light of the limited sample size, the higher criterion-related validity in the remaining three fields, and the contradictory findings from the analysis of the structure of interests for these minority groups.

The second suggestion of cultural differences in interests is for the native American males, based on the finding that the Social Service (Social) and Technical (Realistic) scales were highly related. However, the sample was small and overall percentages of hits and clean misses compared favorably with those for the white males.

These findings suggest similar levels of criterion-related validity and similar interest structures for both minority and white college seniors. However, because the ACT Interest Inventory is but one of many inventories in common use, and because interest measurement is most useful prior to the student's final year of college, the question of generalization of these findings to other inventories and to younger minority populations must be considered.

Generalization of these findings to other interest inventories seems reasonable. Item content of the ACT Interest Inventory is similar to that of other inventories; items include preferences for occupations, school subjects, work tasks, and vocational activities. In addition, it has been documented through considerable research that the six-scale Holland format used in the ACT Interest Inventory provides a useful representation of the basic structure of inventoried interests. As noted by Hanson (1974), numerous factor analytic studies have provided support for the concept of a few basic interest factors consistent with the categories proposed by Holland. The results of this study indicate that with the possible exception of native Americans, this basic structure is similar for white and minority college seniors.

Generalization of these findings to younger minority populations is less certain. In comparison to younger

students, college seniors have had greater exposure to persons outside their own culture. They have had the opportunity for varied social and recreational activities and have been able to read and to pursue academic interests in depth. Thus, failure to find evidence of large cultural differences in the ACT Interest Inventory for college seniors does not provide conclusive evidence that such differences do not exist for younger minority students.

Subsequent research may provide evidence that interest inventories are not appropriate for use with younger members of certain minority groups. Yet, the implication for counseling practitioners of the findings of this study is that minority group membership, in itself, does not contraindicate the use of an interest inventory, or the usual procedures and precautions applied to the interpretation of results.

REFERENCES

- Borgen, F. H., and Harper, G. T. "Predictive Validity of Measured Vocational Interests with Black and White College Men." *Measurement and Evaluation in Guidance*. 6 (1973): 19-27.
- Cole, N. S. "On Measuring the Vocational Interests of Women." *Journal of Counseling Psychology*. 20 (1973): 105-112.
- Cole, N. S., and Cole, J. L. *An Analysis of Spatial Configuration and Its Application to Research in Higher Education*. ACT Research Report No. 35. Iowa City: The American College Testing Program, 1970.
- Cole, N. S. and Hanson, G. R. "An Analysis of the Structure of Vocational Interests." *Journal of Counseling Psychology* 18 (1971): 478-486.
- Cole, N. S., Whitney, D. R., and Holland, J. L. "A Spatial Configuration of Occupations." *Journal of Vocational Behavior*. 1 (1971): 1-9.
- Hanson, G. R. *Assessing the Career Interests of College Youth: Summary of Research and Applications*. ACT Research Report No. 67. Iowa City: The American College Testing Program, 1974.
- Hanson, G. R., Lamb, R. R., and English, E. "An Analysis of Holland's Interest Types for Women: A Comparison of the Strong-Holland and the ACT Vocational Interest Profile Scales for Women." *Journal of Vocational Behavior*. 4 (1974): 259-269.
- Holland, J. L. *The Psychology of Vocational Choice*. Waltham, Mass: Ginn, 1966.
- Holland, J. L. *Making Vocational Choices: A Theory of Careers*. Englewood Cliffs, N. J.: Prentice-Hall, 1973.
- Strong, E. K. *Vocational Interests of Men and Women*. Stanford: Stanford University Press, 1943.
- Strong, E. K. Jr., "Interests of Negroes and Whites." *Journal of Social Psychology* 35 (1952): 139-150.
- Strong, E. K., Jr., "Are Medical Specialist Scales Applicable to Negroes?" *Journal of Applied Psychology* 39 (1955): 62-64.
- Whetstone, R. D., and Hayles, R. V. "The SVIB and Black College Men." *Measurement and Evaluation in Guidance* 8 (1975): 105-109.

Part III: Implications of Recent Developments

Editors' Notes. The articles published in Part II were selected to be representative of the research which has been conducted on interest inventories since publication of the original *Issues* book. Other articles have appeared in print in the past three or four years, and the editors are aware of papers that have not yet reached publication. The papers in this part are an attempt to represent the impact of the recent research and other writing on sex-fairness in interest inventories.

There are three distinct sets of implications that follow from the research thus far. One is for further research, since it is clear that final solutions have not been achieved. Second, there have been changes in inventories as results of research and other thinking which points to ways of handling problems of sex-fairness in counseling. These changes have distinct implications for counselors. Finally, the progress represented by the articles is linked with the legal status of equality of opportunity and efforts to monitor compliance with federal, state, and local statutes. Thus, there are legal implications to consider as well.

Implications of Recent Developments for Future Research in Career Interest Measurement*

By

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Abstract. Some changes in career interest inventories have resulted from recent research and development. This paper presents a summary of the major areas still in need of research to improve inventories for sex-fair counseling. Four categories of research and development are described: 1. revisions of current instruments, whether occupational or homogeneously developed scales; 2. examination of the effects of interest inventories—research on interpretation and the criteria by

which a test can be judged effective in facilitating exploration ("exploration" validity); 3. new instruments, perhaps based on research linking job analysis and measurement of job satisfaction; and developing a method to represent to individuals the relationship of high areas of their interests to the total domain (structure) of occupations or interests.

As with many other areas in education today, counseling and the use of career interest measures have been affected by pressures for social change. The criticisms of the use of tests in education generally have not stopped. The recent Testing Reform Act proposed by Congressman Michael Harrington of Massachusetts (H.R. 6776) is a further indication that continued research and development efforts are necessary to make testing both useful and understood. While Congressman Harrington has aimed his Testing Reform Act at college admissions tests, his focus on the user's understanding of the test results and the emphasis on accurate interpretation are part of the same problems faced by publishers and users of career interest inventories. As the articles in this book indicate, the development of guidelines on sex bias by the National Institute of Education and the work of professional organizations have resulted in significant changes in some career interest inventories. These changes, however, particularly for the occupational scales, are intermediate steps on the way to the development of fully sex-fair interest measures. The following sections provide a summary of the major directions research has taken to improve instruments for sex-fair counseling, and also identify areas still in need of research.

Many of the directions for research are dictated by the basic nature of the scale construction method used

for a particular interest inventory. Also, much of the research has focused on a small set of instruments, the Strong-Campbell Interest Inventory (SCII), the Kuder Occupational Interest Survey (KOIS), and the instruments developed using Holland's typologies of personality and occupations. The methods of scale construction represented in this small set are, however, fundamental to the majority of other instruments constructed. The issues and directions for research are, therefore, applicable to all measures of career interests. The test user is advised that the guidelines, research issues and findings should be considered for any instrument.

The implications of recent developments for future research can be grouped into four categories. First, there are revisions of current instruments, which include occupational or homogeneously developed scales. Second, there is an emphasis on a developing area of research on the effects of interest inventories; that is, research on interpretation and the criteria by which we can say that a test is effective in facilitating exploration. Third, there is the area of new developments. Here the focus is on alternative methods to develop fair instruments and identify valid items. New developments in conceptions of test fairness, job analysis, and measurements of job satisfaction suggest that this is an important area for further development. The last area is both theoretical and methodological, and will be useful for current instruments and newly developed instruments. This area is to meet the need for a better mode of presentation of results to individuals—to represent to individuals the relationship of high areas of their interests to the total domain (structure) of interests or

*This paper presents some of the ideas discussed by the members of the Review Committee at their meeting March 17-18, 1977. The summary and suggestions here are ultimately the responsibility of the author.

occupations. The methodology would result in presenting the individual's results as points in space, located in the domains of occupations or interests sampled, rather than presenting a listing of scores.

Current Instruments

At the item level, the work reported by Hanson and Rayman (1977) indicates that it is possible to construct item pools that include items which are chosen by male and female college students with approximately the same frequency. They were relatively successful in developing and selecting items for five of the six homogeneous scale areas with which they were working. The homogeneous scale with which they were least successful was that representing the Social area. Further effort toward new items in the Social area may mean the development of a full item pool where there are small proportional differences in the numbers of males and females choosing each item within the pool.

The SCII has a large item pool that includes occupational titles, school subjects, activities, amusements, types of people, and preference between two activities. Many of these items are highly sex-stereotyped in our culture. Research is clearly needed on the SCII to identify those items which primarily differentiate between women and men on the basis of their sex alone, and, if necessary, to replace these items with ones more equally preferred by males and females (items that are also valid in terms of distinguishing between occupational groups). Cole and Hanson (1975) provided an example of items included on the physician scale of the SVIB that are likely to be highly reflective not only of sex but also social class differences in prior experiences. Their example suggests that in addition to being sensitive to and examining items for sex and minority group differences in forming new item pools, test constructors should also examine items for their sensitivity to social class differences.

At the scale development level, the work of Webber and Harmon (1977) and Johansson and Harmon (1972) suggests that it is possible to construct a scale which can be used for both males and females in some occupations. Development in this area will be lengthy and time consuming, since it must be done on a scale by scale basis. Johnson (1977, in press) has suggested that the men-in-general and women-in-general groups be eliminated from the SCII scale construction process, as a way of improving the interpretation of the occupational scales. Diamond (1971) has shown that female-male differences on the KOIS are more likely at lower occupational levels than at higher ones, and similar data may be obtained for the SCII. For many professional-level occupations the same scale may be valid for men and women.

Currently the major interest inventories report scores on all scales to each test taker, whether female or male. This has led to concern about interpreting the cross-sex scales. As noted by Johnson (1977, in press) this is somewhat less of a problem for the KOIS than for the SCII because of differences in the method of scale construction. Since a complete revision of the SCII scales is unlikely in the immediate future, research to examine the best way of presenting and interpreting cross-sex scale results to clients is still needed. Most helpful initially may be small-scale process studies of client-counselor interactions in interpreting the full set of scores on the measure of career interests.

The developments recommended here at the item pool and scale construction level are predicated on considerations of reliability and validity. Any change in current items or scales requires careful checking of reliability and validity before implementation. This caution also applies to the development of scales or norms based on combined sex samples, as Webber and Harmon (1977) have demonstrated. Before choosing to use one scale with separate sex norms or combined sex norms, reliability and validity need to be determined. It appears possible to develop scales on combined sex groups for some occupations but not for others. Considerations of validity may mean that the current item pool has to be changed before all scales can be constructed either on combined sex samples or before combined sex norms can be presented to users.

A particular gap in the research literature can be identified from the list of articles included in the book. Little research was found which took into consideration or examined the characteristics of current inventories with special populations. Studies of the reliability and validity of interest inventories with minorities and older women or for groups differing in social class status have not been located, with few exceptions. The few exceptions located did not provide usable or generalizable results for various reasons and most were not included. There is an urgent need to conduct research studies which look at the characteristics of responses at the item, scale and norm level for groups differing by sex, minority status, age and socio-economic status. Reliability and validity need to be determined, in addition to group similarities and differences in performance. As with the identifiable sex differences in responses due to stereotypes and socialization experiences, differences may be found for some activities or job titles when used with minorities. Data for achievement tests indicate that item pools should be examined for these special populations before scales are constructed (Tittle, 1975). This suggestion for research is not intended to mean that "culture free" tests will be developed, since that is not possible, by definition. It

does mean, however, that particularly idiosyncratic cultural experiences reflected in activities and occupational interests would be eliminated from item pools. Research on the "effects" or interpretation of interest inventory results should also be undertaken. At issue here is whether current approaches to presenting results are perceived in the same way by different groups, or whether special approaches may be necessary.

Interpreting Interest Inventory Results

Earlier articles related to test interpretation (see Lunneborg, 1975; Johnson, 1977, in press) show that the area of test interpretation is a most complex one in terms of countering sex bias. For an instrument like the SCII, the men-in-general and women-in-general samples result in higher scores for many women on opposite sex scales of the same name. In fact, the more the interests of members of one sex resemble those of the general reference group for that sex, the less they resemble the general reference group of the opposite sex and the higher their scores on opposite sex scales. The KOIS shows somewhat less effect in this area, with approximately 17 percent of one sample of re-entry women obtaining their highest score on an opposite sex scale (Tittle and Denker, Note 1).

While the earlier guidelines suggest the importance of orientation sessions in providing a "set" for individuals to reduce sex role stereotyping of activities and occupational titles, it is unlikely that this is very effective. Farmer and Bohn (1972) showed some effects for a set of reducing stereotyped profiles of women on the Strong Vocational Interest Blank for Women. However, an experimental study with the KOIS did not show similar results (Tittle and Denker, 1976). These research results suggest that the focus now in research and development should be to design interpretive material to encourage more exploration using interest inventory results.

A recent study by Cooper (1976) poses a direct challenge to the publishers of interest inventories to conduct research to provide interpretive materials that will increase women's exploration of career choices. Cooper compared the effects of the SCII, a non-sexist vocational card sort (VCS), and auxiliary materials designed to make women respondents aware of myths and realities of women in the world of work. Some differences were found in her experimental study. The vocational card sort was more effective in broadening career options and increasing the frequency with which women students read occupational information. Cooper's study needs to be replicated with both women and men, using career interest inventories and materials designed to increase exploration, based on the interest

inventories. Her study used a sample of women, and one interest inventory, limiting the generalizability of results. The direct implications of her results are that the present interpretive materials of career interest inventories are not as effective in stimulating career exploration as other materials (VCS plus auxiliary materials).

The dependent variables in research on test interpretation can be twofold: 1) an increase in the number of careers or occupations the client will consider, and 2) an increase in the number of activities undertaken related to career exploration (compared with control groups). Research is also needed on the extent to which use of basic interest scales, and in contrast to occupational scales or in conjunction with them, yield greater exploration for individuals.

Research designed to examine the question of stereotyping of basic interests represented in homogeneous scales is also needed. Again, the question is whether interpretive materials and treatments can be devised which will expand the number of occupations considered by clients and in addition, whether these include more non-traditional occupations for both women and men. Cole (1973) has suggested that interpretation should emphasize the full range of occupations traditionally considered male or female within any one interest area and also the adjacent areas in a typology of occupations. To the extent that research with other classification schemes for occupations can also demonstrate a structure of occupational interests, then methods need to be developed to assist clients to expand the number of occupations they explore.

An issue related to research here is the stability of interests. While the provision of a "set" to consider all occupational experiences appropriate for either sex can be given before administering the inventory, it is unlikely to have sizeable effect. In designing research to increase career exploration, there may be a disturbance of what some psychologists would hypothesize as a "stable" system of personality, including attitudes and expressed interests. "Treatments" (materials) to increase client exploration may well include discussion of sex role socialization and how socialization processes may result in restricted and stereotyped expression of interests. They may also include materials describing myths about women in the world of work, and the reality of women's participation in the labor force. Research can examine whether this "treatment" has any effect on the results of interest inventories.

The purpose of providing such "treatments" is to increase the diversity of options explored by the individual. This may lead to less predictability for interest inventories over the longrun, at least in the traditional view of prediction of later occupational

entry. Other criteria for validating interest inventories might be used, such as increased satisfaction, as clients devote more attention to assessing a broader range of options and how these relate to their own skills and past experiences. Perhaps "exploration" is the new paradigm for the measurement of career interests rather than prediction. The criterion for validity of interest measures may, therefore, not be "predictive validity" but rather "exploration validity."

Research is needed to further refine criteria for "exploration validity" and to determine the most appropriate research designs to assess this type of validity. A shift in the dependent variables considered appropriate for evaluating interest inventories will lead to increased emphasis in research on the client's interpretation (information processing) of interest inventory results and research on how the client uses these results (decision making). These lines of research mean a basic shift away from the client as object of research to the client as the center of research on career interest measures. Exploration-related validity studies for the number and types of occupations considered by clients have been summarized for the SDS by Holland (1975).

New Developments

Cole and Hanson (1975) provide a strong case for looking at the effects of interest inventories on career choices in a number of ways. In a discussion of definitions of "interest" they point out that how interests are linked to sources and types of job satisfaction is not set forth explicitly in career theory or interest measurement. They suggest that research is needed to better understand this relationship, that of measured interests and types of job satisfaction.

Current interest measures have generally been developed from a strictly empirical base or from a logical clustering of activities thought to be related to a basic interest area. Anastasi¹ has suggested that one of the most pressing needs in interest measurement research is to relate task or job analysis to job satisfaction. This type of research points to the development of new instruments based on functional job analyses, and would in all likelihood result in a closer relationship to refined criterion measures of types of job satisfaction. That is, within particular occupations there may be aspects of the work with which individuals are more or less satisfied. This approach would differ from that used with the occupational and homogeneous scales today, which are based on a set of items that were not typically

identified by relationship to different types or aspects of job satisfaction.

Any approach to research linking expressed interests and activities to functional job activities and the identification of most commonly liked job activities should take into account the need to conduct research on samples representative of diverse groups. Samples of individuals in the occupation should include both sexes and minority groups, as well as different socio-economic backgrounds. Another area of research should examine the relationship between liking particular job activities and more general expressions of job satisfaction. Although Holland's approach, for example, has linked general personal characteristics related to general domains of interests, with accompanying classification of occupations, it would be useful to examine sources of job satisfaction and their relationship to expressed interests on the homogeneous scales.

Research more directly related to the current occupational scales could examine, for both female and male samples, the relationship between item responses and expressed job satisfaction. This line of research would differ from the paradigm proposed by Johansson and Harmon (1972) since the analysis would not be totally internal to the occupational groups used to establish the keys (on a global measure of job satisfaction), but would attempt to look in a more analytic way at sources of job satisfaction and identify common sources of job satisfaction for males and females employed in the occupation. Research designs need to be identified to examine the sources of variance in job satisfaction: that variance common to the majority of individuals in an occupation, variance that is situation-specific, and variance that is individual-specific. Research for new instrument development would then focus on job analysis of activities and functions, and types and sources of job satisfaction, rather than strict empiricism in defining a scale or logically identifying activities for interest areas. An additional benefit to this approach would be the availability of the analysis of job functions and sources of satisfaction to those developing career education programs. Career education programs include identifying and broadening basic career related experiences, increasing motivation, and expanding the range of careers explored. Research in analyzing job activities and functions in occupation and sources of job satisfaction would assist in developing the conceptual base for programs and instructional materials.

The extent to which the effects of sex role socialization and stereotypes can be removed from current interest inventories or reduced by interpretive materials is not known. If we are genuinely concerned with expanding career choices of both sexes, research must be directed toward new instruments rather than

¹ Presented in a meeting of the Review Committee for the present book, March 17, 1977.

resorting only to re-analysis of current inventories and attempts to devise methods of interpretation to expand options. These are interim activities, for the long range goal is to understand better the common interests of men and women and how these relate to sources of job satisfaction and job performance. When job functions and sources of satisfaction are more formally analyzed, then it may be possible to link these also to everyday experiences for individuals, relating their present interests with those of the world of work and job satisfaction. This analysis may also indicate the need to develop different instruments for older clients, that is women seeking to re-enter the education or work systems and those men and women considering career changes. The types of experiences and activities in the everyday lives of these individuals may differ from those of high school and college students in sufficient degree to require a different set of items for the most realistic linking of interests and job satisfaction.

Reporting Inventory Results

Current career interest inventories are limited in terms of the number of occupations sampled and the influence of sex role socialization upon expressed interests. There is also a shift from emphasizing predictions to exploration as a major goal in using interest inventories. These concerns indicate a need to go beyond presenting lists of individual occupational scale scores to individuals, to plot or otherwise better represent the individual's interests in the structure of occupations. This type of score reporting would encourage individuals to see that in fact there is a domain of occupations and where their interests fit within this domain.

It has been suggested, for example, that less emphasis should be placed on the occupational scales or that they should be withdrawn. The occupational scales may be more useful if the present way of presenting results to individuals on the report form can be changed. Results could be shown by a two-dimensional display, showing where the occupations are placed within the structure of the domain of occupations (reflecting the sampling of occupations in the inventory), and the individual's location (for highest scales).

Given the present state of knowledge of the relation of interests to occupational entry and the uncertainty as to what the occupational structure may mean psychologically to the individual making career-related decisions, a graphic presentation of the structure of occupations and the individual's present interests may best serve the individual — showing the lack of precision in career interest measures and the importance of taking test scores as suggestions for developing areas of

occupations to explore. Rather than to "tell me what I should be or do," the more graphic display would show the individual that occupations are not located specifically within a single interest area but tend to emphasize one area or another. Process and experimental studies will be needed to examine how individuals respond to lists of occupations versus how they interpret a graphic display. This again would place the emphasis in research on the client as processor of information. Little is now known about how individuals perceive interest inventory results and how these results are integrated with other information they have about themselves.

In summary, the main areas for research are first, the revision of current interest inventories, with a particular need to examine the performance of special groups such as minority and older women on career interest inventories. Second, the assessment of the exploration validity of interest inventories. Here the emphasis is on developing interpretive materials or "treatments" for the presentation of interest inventory results that will increase the number and types of occupations explored and other criterion-related activities. Third, research directed toward new measures of career-related interests. The link between interests and types and sources of job satisfaction are not understood at present. Research is needed which begins with an analysis of occupational job activities and functions, examines the likes and dislikes of individuals related to these functions, and links this information to daily activities about which individuals can express interest. Fourth, there is a need for a technological development in presenting interest results to individuals. Interest inventory scales represent a sampling of occupations. A graphic display showing the individual's higher interest points in a representation of the structure of the domain of occupations may greatly facilitate exploration and result in less emphasis on specific score results.

Research, then, can serve two functions: The first is how best to use and improve the sex-fairness of current instruments, based on data now becoming available. The second function is to look forward, to examine how inventories can be developed based on an increased understanding of the relationship of expressed interests to sources and types of job satisfaction. As both these functions are carried out, researchers need to be sensitive to the subtle effects of minority and sex-linked experiences both on the individual's responses to items and in research design and choice of variables to study. Issues of sex bias in interest measurement should have, and to date have had, a healthy effect on the examination of current instruments and defining needs for further research. The next steps are to use our increasing understanding of the effects of status variables on individual experiences and responses to develop

instruments more uniquely suited to furthering and facilitating the exploration of individual interests.

REFERENCE NOTES

1. Tittle, C. K. and Denker, E. R. "Interpreting Cross-Sex Scales on the KOIS for Re-Entry Women." Submitted for publication, 1977.

REFERENCES

- Cole, N. S. "On Measuring the Vocational Interests of Women." *Journal of Counseling Psychology* 20 (1973): 105-112.
- Cole, N. S. and Hanson, G. R. "Impact of Interest Inventories on Career Choice." In E. E. Diamond, Editor, *Issues of Sex Bias and Sex-Fairness in Career Interest Measurement*. Washington: National Institute of Education, 1975.
- Cooper, A. F. "Comparative Impact of theSCII and the Vocational Card Sort on Career Salience and Career Exploration of Women." *Journal of Counseling Psychology* 23 (1976): 348-352.
- Diamond, E. E. "Occupational Interests: Male-Female or High-Low Level Dichotomy?" *Journal of Vocational Behavior* 1 (1971): 305-315.
- Hanson, G. R. and Rayman, J. "Validity of Sex-Balanced Interest Inventory Scales." *Journal of Vocational Behavior* 9 (1976): 279-291.
- Holland, J. L. "The Use and Evaluation of Interest Inventories and Simulations." In E. E. Diamond, Editor, *Issues of Sex Bias and Sex-Fairness in Career Interest Measurement*. Washington: National Institute of Education, 1975.
- Johanssen, C. P. and Harmon, L. W. "Strong Vocational Interest Blank: One Form or Two?" *Journal of Counseling Psychology* 18 (1972): 404-410.
- Johnson, R. "Relationships Between Female and Male Interest Scales for the Same Occupations." *Journal of Vocational Behavior*, 1977, in press.
- Lunneborg, P. W. "Interpreting Other-Sex Scores on the Strong-Campbell Interest Inventory." *Journal of Counseling Psychology* 22 (1975): 494-499.
- Tittle, C. K. "Fairness in Educational Achievement Testing." *Education and Urban Society* 8 (1975): 86-103.
- Tittle, C. K. and Denker, E. R. "Home-Career Conflict Reduction Revisited: The Effects of Experimental Directions on KOIS Scores for Women." *Educational and Psychological Measurement* 36 (1976): 1079-1087.
- Webber, P. and Harmon, L. W. The Reliability and Concurrent Validity of Three Types of Occupational Scales for Two Occupational Groups: Some Evidence Bearing on Handling Sex Differences in Interest Scale Construction. See Part II, B, above.

Implications for Counselors of Research on Sex-Fairness in Interest Measurement

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Abstract. This paper describes a number of attitudes and skills which counselors will need to develop as a result of the progress by interest inventories toward sex-fair measurement. Because inventories now report non-traditional alternatives, counselors must examine their own attitudes toward "appropriate" occupations for men and women, not as abstract things, but as they are expressed in dealing with the stated concerns of clients. Several resources to help with this task are

described. The use of inventories to generate alternatives the person should consider and questions of the attendant validity to this purpose are also discussed. Another responsibility of the counselor is the evaluation and selection for a particular client of a particular inventory as it is affected by recent research. Finally, ways of dealing with male-female differences in occupational scales are discussed.

As the AMEG Commission report says, "... a great deal of change is going on in interest measurement." What is perhaps not so evident is that many changes for counselors and the ways they practice follow from the changes in the inventories.

Some of these changes may have already been apparent in the overview to Part II of this book. This paper will attempt to consolidate and make more explicit how the changes are likely to affect counselors. There are several themes to explore:

- changes in thinking about appropriate occupations by counselors and by their clients,
- changes in the ways inventories are used,
- changes in the expertise needed to select and use inventories
- and changes in the use of the empirical, occupationally scaled instruments.

Sex-fair interest measurement is not an isolated movement. Since interest measurement is a guidance technique, it may be placed in the midst of concern for sex-fair counseling, which in turn, is embedded in sex-fair education, which is what Title IX is all about.

Appropriate occupations

Interest inventories have become instruments of social change. At most, the impact of Title IX on interest measurement promotes fairness; at the least, it has resulted in the presentation to men and women of additional occupational possibilities, which although interest-appropriate, are not traditional for the genders.

Counselors are required by this circumstance to examine their own thinking on the appropriateness of sex-stereotyping the occupations to which a client or

student should give serious consideration. For instance, imagine a high school senior woman, who when you ask what her educational plans are, says that she wants to go to the local private business college for a one-year training program in bookkeeping. Imagine further that she has taken more mathematics than the usual woman does in the high school curriculum, and that her grades are superior. Will you suggest she consider going to a four year college, or assume that she will discover something other than bookkeeping more challenging and satisfying after she gets a job in the field? Will you suggest that she should investigate scientific occupations, mathematics occupations, or accounting and business occupations? Will you inquire into what role models she has for undertaking training which is more demanding than bookkeeping, or what financial, social, or emotional support she has to meet the inevitable problems that arise in the course of a college education?

Or consider the young man whose family has produced several generations of business men and who could easily continue in it, but who is interested in social work and wants to discuss the validity of his interest with you. Or the young man whose interest inventory gives him his highest score on nursing? What biases of your own might intervene in your handling of interest inventory results? Will you overlook possibilities, misdirect attention, give extra emphasis, or by a host of other subtle cues influence the person to entertain seriously only certain possibilities. In other words, what the person may get from talking with the counselor about his or her interest profile may be colored by the counselor's attitude toward men employed as kindergarten teachers or women as machinists.

This problem has another side, as well. A too aggressively sex-fair counselor may well overinterpret a profile as indicating non-traditional roles and influence a

young person to attempt a role for which she or he is ill-suited. For example, could you manage your disappointment with a talented biology student who decides to quite a pre-med program because she finds it just too competitive to suit her personality organization? Or who says she'd like to be a surgeon, but just isn't up to the problems she knows she will have to endure. Compare your response with how you'd think if the artistically-oriented young man wanted to talk about his parents' opposition to his studying fashion design. Or the young man who had thought of being an elementary teacher but gave it up after hearing his friend's reactions to the idea.

In other words, there is more to sex-fair counseling than simply placing a number of non-traditional options before your student or client. As the NIE *Guidelines* suggest, counselors should not rely alone on interest measuring instruments; they should incorporate the results of interest inventories with personality attributes, value systems, measured or intuited and a number of other things which go into career planning and decision making. Still, it is appropriate to assure that non-traditional, yet potentially satisfying options are offered to inventory-takers in some manner that they cannot simply ignore them.

So without insisting that people pursue non-traditional occupations, surely they will benefit from discovering more about those occupations than that they have interests in common with them. This suggestion that counselors will need to develop skills to expand concepts about careers and occupations, to stimulate and guide exploration, and to deal with closed-mindedness. There are many books, programs, workshops or curriculum units designed to open the mind to diverse possibilities. Several of the more comprehensive ones are as follows:

Birk, Janice M. *Providing Life/Career Planning for Women and Girls*. Palo Alto: American Institutes for Research, 1976. A curriculum module describing the use of a number of projects, such as taking and discussing the Bem Sex Role Inventory, viewing examples of sex-biased illustrations of work roles, participating in a simulated town meeting and the like.

Farmer, Helen, and Backer, Thomas. *New Career Options for Women*. New York: Human Sciences Press, 1977. A three-part series for counselors, counselor trainers and women thinking about careers. Includes a counselor's sourcebook which covers books, films and organizations useful to counselors; a woman's guide which summarizes the topics in the counselor's sourcebook, plus reviews of employment opportunities, legislation, combining family and careers, etc.; and a selected

annotated bibliography, containing 240 annotations of books, articles and reports pertaining to women and work.

Vetter, Louise, and Sethney, Barbara. *Planning Ahead for the World of Work*. Columbus: Center for Vocational Education, Ohio State University, 1975. A two week classroom unit, found to be most suitable for early high school years, which includes a teacher's manual, student materials and transparency masters.

Many other materials have been prepared for the personal and professional development of counselors in sex-fair counseling and use of interest inventories. Two issues of *The Counseling Psychologist*, Volume 4 (1973) Number 1, and Volume 6 (1976) Number 2, are devoted entirely to counseling women. They detail some of the subtle forms that sex bias takes in counseling, the unreality of many assumptions, and suggest ways to develop a scientifically supported stance on the role(s) of women.

See also:

Stebbin, Linda; Ames, Nancy, and Rhodes, Illana. *Sex-Fairness in Career Guidance: A Learning Kit*. Cambridge: Abt Associates, 1975. The kit consists of a book (from which Appendix B, the expanded sex-fairness guidelines are taken) and a tape recording, which illustrates ways of dealing with resistance and assuring sex-fair career counseling.

Verheyden-Hilliard, Mary Ellen. *A Handbook for Workshops on Sex Equality in Education*. (The SEGO Project) Washington: American Personnel and Guidance Association, 1976.

Changes in Interest Inventory Uses

In their early years, interest inventories were used to identify the or a few occupation(s) in which the inventory taker was most likely to find satisfaction. Although this predictive use was founded on the idea that a person works at just one occupation in his or her worklife, it is probably still useful if the person is indecisive at the time when a commitment to training or entry into an occupation is required. More recent thinking about the occupational lives of people has developed the view that there are different tasks to be accomplished with regard to gaining an occupational identity, depending upon the stage of one's development. It is better understood that high schoolers and some older persons express career choices which are very limited in scope, and counselors have begun to use interest inventories at this time to suggest additional

alternatives to be explored. Prediger, in a number of publications, has applied the term "should consider" to this use.

The "should consider" or exploration use of interest inventories does not require the same kind of validity which the predictive use requires. Rather the exploration use of interest inventories calls for such questions to be answered as, "After taking this inventory, does the person express a larger variety of tentative career choices?" or "Do people who take this inventory seek information on several possible occupations?" or "Do people get a clearer picture of their interest pattern?" (Blake and Fabry, Note 1, found that only 36 percent of high schoolers correctly estimated their pattern of scores on the scales of the Strong-Campbell Interest Inventory which measure the Holland typologies.)

Then, another form of validity must underlie the "should consider" use of an interest inventory. It should answer such a question as, "Are the occupational possibilities which this inventory suggests be explored likely to be satisfying to him or her should they enter one of them?" The problem with assessing this kind of validity of an interest inventory is that there is no exact way to establish what is reasonable for any person, since it can't be known how many jobs and occupations the person might work at and be satisfied. Yet, an inventory that does not succeed at this task at all could hardly have "should consider" validity, since it would be little better than simply referring the person to the *Occupational Outlook Handbook* (U.S. Department of Labor, 1976) to read all of the 800 or so descriptions that it contains.

Most significantly, inventories which even in the past gave "should consider" results tended to comply with the social expectations of gender-appropriate occupations. There were no scales to suggest carpentry or business executive to women, or nursing or secretary to men. With the stimulus provided by Title IX, several interest inventories which in the past yielded chiefly stereotyped prospects to the taker have been adjusted to suggest non-traditional possible occupations that the person should consider.

Evaluating Interest Inventories

In many work settings it is the counselor who decides what interest inventory(ies) he or she will use, and particularly which one will be used in response to the needs of a given person. These selection skills are usually established in the psychometrics or tests and measurements courses in the counselor's preparation. However, selection now requires not only technical skills but also consideration of the subjective foundation or "view of the world" which is embodied in a particular measure of

interests. So, each counselor is virtually required to inform him- or herself of the orientation of any inventory toward sex-fairness, and how that orientation, as well as the inventory's psychometric attributes, will affect the uses to which it is put.

Masculine language. Following the format of this book, the first matter of concern should be the inventory's use of masculine terms, and the generic use of "he" in the test materials, as well as any explanatory materials which accompany it. The AMEG Commission report shows that many of the major publishers have made changes which make their products acceptable. However, there are many useful though not widely circulated inventories which still may violate this desirable approach. A counselor might modify sexist language, being careful not to introduce changes which will have negative effects on established norms or similar features.

Different Item Popularities for the Sexes. Probably more important is the relative rates of endorsement of items by each sex, and how this is managed, if at all, in the norming or interpretation of scales. For example, the Ohio Vocational Interest Survey, which is not the subject of any research reported in this book, has a few items (less than 10 percent of the total) which are not scored for one sex or the other because they are endorsed so rarely by that sex. The counselor would be well advised to read the manual to see how the inventory handles this situation, and whether he or she would want to devise a procedure to offset any bias which this separate scoring introduces.

Many inventories have items which were long ago gleaned from a large pool for their effectiveness in fitting on scales or discriminating occupational groups. Generally such inventories control for the division in high scores that would result from different rates of endorsement by the sexes by constructing norms for each sex. This has the effect of giving males and females an equal frequency of high scores on scales which raw scores or combined norms would make sexually stereotyped. The Kuder Preference Record, Forms C and E, are examples of such an approach. But these inventories do not give information on different rates of endorsement of the items by sex in their manual; that fact must be inferred from the presence of separate norms. Some indication of the differences in popularities of items assigned to each scale can be gained by scoring the mean or median score of one sex on the scales normed on the other sex. A counselor would do well to plot such scores in order to be aware of the relative impact of sex differences in the norms so that it could be explained to a client, if needed.

Several inventories, such as the ACT-Interest Inventory, the Self-Directed Search, and the Basic Interest Scales and General Occupational Theme scales of the Strong-Campbell Interest Inventory yield scale scores, and also are fitted with means to identify occupations or fields of study which follow from the person's high scores. The NIE *Guidelines* state that the methods should give referrals to the various alternatives in equal proportions for each sex. But it is suggested by the articles in Part II that the techniques used to achieve this goal have implications for the validity of the inventory. For one, the ACT Interest Inventory uses a statistical technique which weights each scale into the most predictive combination for each area. This means that it is difficult to identify a cutoff score, below which a person should probably not consider. The matter of the minimum acceptable degree of similarity has not been investigated and counselors should be cautious about the implications of validity with which they accompany their discussions of results with clients.

Holland's Self-Directed Search and Vocational Preference Inventory gives a three letter code to represent the person's highest scores, with which he or she searches for "should considers" from a list of occupations correspondingly coded. The person is advised to use all combinations of his or her three letters, as though they were all tied for first rank if the actual order does not produce enough alternatives. Since Holland does not normalize scale scores, differences in item rates of endorsement will result in relatively stereotyped alternatives being suggested. Normalized scores would result in quite different three letter codes to consider. Since Holland has in his latest (1977) edition of these instruments replaced some items which showed seriously different rates of endorsement, they have become relatively more acceptable in terms of use to generate "should considers." This underlines the necessity for counselors to continuously monitor improvements in interest inventories and to be sure they are using the most acceptable edition.

"*Exploration Validity.*" Predictive validity is no longer the ultimate form of validity for an interest inventory. Rather, for some inventories "exploration validity" (as Tittle designates it in the *Implications for Research*) must be considered. For this validity, the counselor must evaluate the inventory in terms of the occupational prospects suggested for additional exploration or consideration. The questions which must be answered concern whether the inventory results lead the client to explore the attributes of a number of occupations, and learn more about his or her interests, values, and other requirements for job satisfaction. As well, it should be established whether the results lead the

client to consider non-traditional but otherwise potentially satisfying occupations rather than those limited to outdated conceptions of what is appropriate work for men and women.

These matters do not depend directly upon long-term predictive validity, but of course do not exempt the inventory from being shown to have some, since the alternatives the inventory suggests must still be "realistic" ones — occupations that have a reasonable likelihood of resulting in job or occupational satisfaction for the person considering the results.

The Counselor as Consultant. Since there are alternative avenues to sex-fairness, depending upon how the interest inventory is constructed, a responsibility is placed upon the counselor-user to make the necessary assessment of sex fairness, as well as basic utility of the inventory, from the data available. The expertise which the counselor is likely to develop in this task suggests another role. Schools and agencies which use tests and inventories will have compliance or affirmative action officers who are required to monitor and report whether their institution is in compliance with Title IX and perhaps with future acts of Congress. Because these people are unlikely to be versed in the intricate technical and sometimes incomplete solutions to sex bias in interest measurement, counselors will increasingly be called upon to assist in the determination of compliance. This will not only require the counselor to be informed, but also to be able to explain the "state of the art" in non-technical, lay language.

Counselors have traditionally relied upon the evaluations in Buros' *Mental Measurements Yearbooks* (MMY) in deciding whether or which inventory to use. Since the sex-fairness issue has come into being since the last MMY and because changes in inventories toward sex-fairness are ongoing and likely not to be fully reflected in the next edition, counselors will need to be more responsible for making their own evaluations. Test reviews in such publications as *Measurement and Evaluation in Guidance* take cognizance of sex bias, and are a good resource. Famer and Anderson (1977) have produced a book entitled *Interest Inventories: A Counselor Sourcebook*. (Copies may be obtained from the Illinois Department of Education, Springfield, Ill.) This book gives brief reviews of interest and work value inventories found to be most used by counselors in Illinois schools. Sex-fairness considerations are explicitly treated in many cases and make the reviews a valuable up-to-date resource.

Occupational Interest Inventories

A key problem of the occupational interest

inventories, that is, those which compare the inventory taker to groups of persons in a variety of occupations, is that the number of scales available for women is usually fewer (and usually more role-limiting) than for men. In fact, one inventory of this type was developed exclusively on groups of men and never considered applications for women.

Publishers are adding scales to equalize those available for the genders, but it will require substantial time and money. Until inventories are changed, what should counselors do when they want to use occupational interest inventories with clients? The solutions are specific to the inventory. For example, on the Kuder Occupational Interest Survey (KOIS) there is usually an overall difference in the level of scores on the own-gender normed scales and the other-gender normed set. This means that the two sets may not be merged into a single overall ranking of occupations for the client's consideration. In the use of the KOIS in the Career Development Program, an adjustment which makes both gender normed scales comparable is built into the scoring system. When using the KOIS alone, the publisher recommends that converting scale scores into ranks within sets yields valid results. So a woman who wants to know whether being a chemist would be appropriate for her would look at the rank of the Chemist scale among the other scales which have been normed for men. Conversely, a man may be directed to the rank of his score on the Nutritionist scale, which on the KOIS has been normed on a group of women nutritionists. These ranks will be directly comparable to the ranks of scales in their own-gender normed set.

Another example is the Strong-Campbell Interest Inventory (SCII). Here the ranking procedure is apparently not appropriate, according to Johnson. To find whether a person should consider or elect to pursue an occupation which is not among those normed for his or her sex, the person must ascertain the predominant (so-called) Holland code represented by his or her profile and use Holland's *Occupations Finder* to discover whether the occupation in question is consistent with the three letter code developed from his or her own sex scales. Campbell in the latest edition of the SCII Manual (1977) elaborates this procedure.

It is fair to point out that while the General Occupational Theme scales from which the Holland code may be formed have good internal consistency, the test-retest reliability of the three letter codes has not been established. The scales are composed of few items, and a change in one response could result in a sufficiently large change in the score of one scale could exclude or downgrade the consideration of one or several occupations. Thus, until such reliability data are produced, this approach would at best seem cautionary.

Summary

The thrust toward sex-fair interest measurement given by Title IX and similar developments has impact on counselors as no other recent event or legislation. It surely requires counselors to examine their own concepts of traditional and non-traditional occupational roles, as well as to develop skills in using inventories in sex-fair ways and to deal with the resistances of others in their consideration of occupations. Counselors must also be aware of the changes in the use of the interest inventories which sex-fairness has stimulated, and should understand how to evaluate and use them in the light of the changes. The changes call upon counselors to develop new skills in evaluating interest measurement instruments which they never were required to have before, and be able to explain in non-technical language how instruments are or are not sex-fair, or how they are used in the most sex-fair ways. The challenge is substantial.

REFERENCE NOTE

- Fabry, J. and Blake, R. "Repeat Reliability of the Strong-Campbell Interest Inventory." Unpublished research report, The Counseling Center, University of Nebraska, Omaha, 1977.

REFERENCES

- Campbell, D. *Manual, Strong-Campbell Interest Inventory*, second edition, Stanford: Stanford University Press, 1977.
U.S. Department of Labor. *Dictionary of Occupational Titles*. Washington: U.S. Government Printing Office, 1976.

Legal Issues Regarding Sex Bias in the Selection and Use of Career Interest Inventories

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Abstract. This paper will expand upon the paper "The Legal Implications of Sex Bias in Interest Inventories" by Laurine E. Fitzgerald and B. Jeanne Fisher, written for *Issues of Sex Bias and Sex Fairness in Career Interest Measurement*, to set forth more fully the various sources of law which set requirements on guidance test selection and use for school systems and counselors. It will focus on laws relevant to test use for career guidance, rather than as employee selection criteria, and will indicate steps which counselors and teachers can take

to select among and use currently available tests in a manner which complies with legal requirements. Also, the paper will indicate what interpretative materials counselors can seek from test publishers to assist their task, and what materials should be made available directly to students to assure a more bias-free use of the tests. Finally, remedies are set forth which are available to students, parents and counselors to guard against bias in use of career interest inventories and to eliminate bias when it becomes apparent.

INTRODUCTION

This chapter sets forth the legal framework which teachers and counselors must apply to selection and use of standardized career interest measurement instruments. In particular, it addresses the legal problems which test users face because of sex bias in currently available career interest inventories, and suggests steps for counselors, test publishers, students and parents to take in order to attain bias-free career guidance.

The legal issues relating to sex bias in career interest inventories have been raised previously in "The Legal Implications of Sex Bias in Interest Inventories," by Laurine E. Fitzgerald and B. Jeanne Fisher (1975). That chapter notes that no cases have been decided that specifically consider sex bias in career interest inventories. It then summarizes the legal process of using analogies for guidance in such matters; outlines court interpretations of the federal laws establishing requirements for elimination of bias in tests used by employers for job selection, and the standards which have been developed under state laws and by certain professional associations regarding test selection and use. Finally, that chapter sets forth recommendations for test use and for development of new laws and regulations affecting test selection and use. The Fitzgerald and Fisher paper provides an important first step toward evaluating the laws which schools must take into account in selecting and using career interest inventories.

This paper will expand upon Fitzgerald and Fisher to set forth more fully the various sources of law which set requirements on guidance test selection and use for school systems and counselors. It will focus on laws

relevant to test use for career guidance, rather than as employee selection criteria, and will indicate steps which counselors and teachers can take to select among and use currently available tests in a manner which comports with legal requirements. Also, the paper will indicate what interpretative materials counselors can seek from test publishers to assist their task, and what materials should be made available directly to students to assure a more bias-free use of the tests. Finally, remedies are set forth which are available to students, parents and counselors to guard against bias in use of career interest inventories and to eliminate bias when it becomes apparent.

I. THE LAWS APPLICABLE TO TEST SELECTION AND USE

A number of Federal laws set requirements for elimination of sex bias in schools affected by those laws. The two broadest laws are the Fourteenth Amendment to the United States Constitution, which requires non-discrimination by public schools, and Title IX of the Education Amendments Act of 1972, which sets forth specific requirements for eliminating bias in test use and counseling for every school which receives federal funds. National Institute of Education guidelines and proposed Office of Education guidelines provide additional assistance in applying Title IX requirements. Other relevant federal laws are the Vocational Education Act, as amended, which requires the states to develop plans to eliminate sex bias in Federally-supported vocational educational programs; and Title VII of the Civil Rights Act of 1964, as amended, which indirectly affects

schools assisting students in seeking employment. State laws as well may impose requirements regarding elimination of sex bias. Since they vary widely, their specific requirements are beyond the scope of this paper.

A. The United States Constitution

The Equal Protection Clause of the Fourteenth Amendment provides that "No State shall . . . deny to any person within its jurisdiction the equal protection of the laws."¹ The Clause requires any public school to assure that students are accorded equal treatment regardless of their sex.² Although services may in some instances be provided separately, even separate services must be equal.³ Although no constitutional case specifically discusses use of career interest inventories, this constitutional requirement dictates that in public schools career guidance, including test selection and use, must assure equal opportunity for all careers to male and female students.⁴ Public schools using tests that are not bias free themselves must, to comply with the U.S. Constitution, provide ancillary counseling and backup services sufficient to assure that students are being accorded equal opportunities regardless of sex. Because virtually all schools covered by the U.S. Constitution

will also be covered by Title IX, which sets forth more specific requirements regarding use of career interest inventories, school practices may not often be challenged as being unconstitutional. Nevertheless, attention must be paid to underlying constitutional requirements.

B. Title IX of the Education Amendments Act of 1972

Title IX of the Education Amendments Act of 1972, 20 U.S.C. § 1681 *et seq.*, provides:

No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance. . .

The law is administered by the U.S. Department of Health, Education and Welfare (HEW). Although HEW maintains no systematic list of schools covered by Title IX, virtually every public school in the country (and some private schools) receive Federal funds through a myriad of programs,⁵ and is, therefore, covered by Title IX. Failure to comply with the provisions of Title IX, as well as with the regulations and interpretations issued under the statute, can result in loss of federal funds or prosecution by the U.S. Department of Justice.

The language of Title IX itself impose broad and general requirements of non-discrimination on schools and educational programs. HEW has also issued more detailed and specific regulations under Title IX to clarify its application in specific circumstances. Two regulations are particularly relevant to schools in selecting and counseling about career selection. These are:

45 C.F.R. 586.36: *Counseling and use of appraisal and counseling materials.*

(a) Counseling. A recipient shall not discriminate against any person on the basis of sex in counseling or guidance of students or applicants for admission. (b) Use of appraisal and counseling materials. A recipient which uses testing or other materials for appraising or counseling students shall not use different materials for students on the basis of their sex or use materials which permit or require different treatment of students on such basis unless such different materials cover the same occupations and interest areas and the use of such different materials is shown to be essential to eliminate sex bias. Recipients shall develop and use internal procedures for ensuring that such materials do not discriminate on the basis of sex. Where the use of counseling test or other instrument results in a substantially disproportionate number of members of one sex in any particular course of study or classification, the recipient shall take such action as is necessary to assure itself that such disproportionate number

⁵Such programs include the School Lunch Program, and grants under the Title I program for disadvantaged students.

¹The Fourteenth Amendment applies to action by the states. The Fifth Amendment establishes the same requirements for schools operated by the federal government and by the District of Columbia. See, e.g. *Bolling v. Sharpe*, 347 U.S. 497, 499 (1955).

²See, e.g. *Berkelman v. San Francisco Unified School District*, 501 F. 2d 1264, 1270 (9th Cir., 1974); *Bray v. Lee*, 337 F. Supp. 934, 937 (D. Mass., 1972); *Brenden v. Independent School District 477 F. 2d 1292* (8th Cir. 1973); cf. *Vorcheimer v. School District of Philadelphia*, 532 F. 2d 880 (3rd Cir., 1976), affirmed by an equally divided court, 97 S. Ct. 1671, (1977) (Equal Protection Clause applies; practice at issue found in compliance with the Clause).

³The standards which courts will apply in determining whether a particular practice is sex discriminatory under the Equal Protection Clause is evolving. At least, a challenged practice will have to bear a "fair and substantial" relationship to the stated purpose for the practice. *Reed v. Reed*, 404 U.S. 71 (1971). However, during the past year, the Supreme Court has indicated that a more stringent standard may be applied. See, e.g. *Craig v. Boren*, 97 S. Ct. 451 (1976) ("classifications by gender must serve important governmental objectives and must be substantially related to achievement of those objectives."). Moreover, a program designed to compensate the heretofor disadvantaged sex in the circumstances may also be upheld. See, e.g. *Califano v. Webster*, 97 S. Ct. 1192 (1977).

⁴*Berkelman v. San Francisco School District*, *supra*; and *Bray v. Lee*, *supra*, were both cases in which courts set aside school practices of using different test scores for men and women to determine admission to school "honors" programs.

of members of one sex in any particular course of study or classification, the recipient shall take such action as is necessary to assure itself that such disproportion is not the result of discrimination in the instrument or the applications.

75 C.F.R. §86.38: *Employment assistance to students.*

(a) Assistance by recipient in making available outside employment. A recipient which assists any agency, organization or person in making employment available to any of its students:

- (1) Shall assure itself that such employment is made available without discrimination on the basis of sex; and
- (2) Shall not render such services to any agency, organization or person which discriminates on the basis of sex in its employment practices.

In addition to these regulations, HEW occasionally responds to requests for further clarification on Title IX's application to a particular school policy. The Title IX interpretations, often in the form of letters, provide helpful guidance to covered schools. Such an interpretation has been issued regarding career interest inventories. It provides that appraisal or counseling instruments will meet Title IX requirements if the test, used in a counseling context, will:

- Provide technical information that gives a rationale for separate scales and/or separate norms by sex which demonstrates that such separation is essential to the elimination of sex bias.
- Indicate the same vocational areas and/or occupations for each sex, with the sex composition of the norming groups for each scale clearly indicated.
- [Support] the reporting of scores for one sex on scales normed or constructed on the basis of data from the other sex by a pattern of evidence of validity established for males and females scored on pairs of similar or same-named scales measuring the same constructs.
- [Explain] how to interpret scores on own-sex and other-sex norms... in the interpretative materials for counselor and counselee, and in such way as will help them see there is virtually no activity or occupation that is exclusively male or female. In addition, where separate norms are given for each sex, steps are taken to insure that the counselee receives his or her scores on both sets of norms.⁶

Further ambiguities in use of career interest inventories may in the future be clarified by supplemental letters from HEW. HEW has also indicated that it may review some of the career interest inventories

⁶This interpretation is set forth in a letter dated April 2, 1976, from Lloyd R. Henderson, Director, Elementary and Secondary Education Division, Office of Civil Rights, HEW, to Dr. Esther E. Diamond, Senior Project Director, Development, Science Research Associations, 259 East Erie Street, Chicago, Illinois, 60611.

currently in use to determine whether they meet the requirements of Title IX.⁷

No cases have yet been decided regarding the application of Title IX to selection and use of career interest inventories. However, it is likely that the law under Title IX will continue to develop in this area, in response to the actions and concerns of schools and students, as well as in response to modifications in the tests. To assure that the most recent interpretations of Title IX are being applied, schools should develop a method for monitoring HEW's regulations and rulings under the statute.⁸

C. NIE Guidelines and Proposed Office of Education Guidelines on Counseling and Guidance Programs

The National Institute for Education, an agency which is part of HEW, has developed a detailed set of guidelines and recommendations regarding elimination of sex bias in selection and use of career interest inventories. These guidelines are set forth in Appendix A to this book. Although the guidelines do not themselves have the force of law, they comply well with the Title IX regulations and interpretations set forth above. Therefore, they provide useful guidance to schools in applying the Title IX requirements.

Similarly, Joyce Cook of the U.S. Office of Education has drawn up proposed guidelines for eliminating sex bias in counseling and guidance programs which fit the requirements of Title IX and provide assistance in applying the law. Those guidelines are Appendix 1.

D. The Vocational Education Act Non-Bias Requirements

Title II of the Education Amendments Act of 1976, 20 U.S.C. § 2301-2461, which amends the Federal Vocational Education Act, was enacted in part to authorize Federal grants to states to assist them "to develop and carry out such programs of vocational education within each state so as to overcome sex discrimination and sex stereotyping in vocational education programs (including programs of homemaking), and thereby furnish equal educational opportunities in vocational education to persons of both sexes..." 20 U.S.C. § 2301. States which receive funds under the Act must draw up a state plan to assure equal

⁷Telephone conversation between the author and Donna Murasky, consultant to HEW for development of Title IX policy on June 29, 1977.

⁸See below, Section V.

access to vocational education programs in the state by both men and women. 20 U.S.C. §2307(b)(4). The state then has an obligation to put the plan into effect.

Through these Federally-mandated plans, most states will be further regulating vocational training and counseling, which often includes use of career interest inventories. Although the plans will differ from state to state, in broad outline the state coordinator of these provisions of the Vocational Education Act will examine school career counseling to assure that it is providing equal opportunity for men and women and that it is opening up the possibility of jobs in non-traditional fields to all students. Counselors should request a copy of the State Plan from the State Vocational Education Agency to be sure that its provisions are being met.⁹

E. Title VII of the Civil Rights Act of 1964

An extensive legal structure for evaluating tests used by employers for selection (rather than guidance) of employees has developed under Title VII of the Civil Rights Act of 1964, as amended.¹⁰ That law prohibits discrimination in employment on the basis of race, sex, color, religion and national origin. School guidance counselors do not generally act as employment agencies and do not use career interest inventories for job selection. However, if schools do become involved in the job selection process, they may well be covered by the provisions of Title VII.¹¹ Because of the coverage of Title VII, counselors will want to assure themselves that they are using career interest inventory instruments, which are in many cases themselves currently biased, for

purposes of job selection, and that they are expressly encouraging students and employers also not to do so.

F. State Laws and Regulations

Finally, selection and use of career interest inventories may be affected or regulated by relevant state laws. Such laws include state Equal Rights Amendments, state equal educational opportunity laws and local human rights laws. These laws are far too numerous and disparate to itemize. Many follow the Federal provisions, but in some instances have been interpreted by the states to impose different requirements. The attention of the school and the guidance counselor is directed to the state education and state human rights offices, as well as to the state legislature, each of which will be able to provide relevant laws and regulations.

II. SELECTION OF TESTS AND SUPPORTING TECHNICAL MATERIALS UNDER THE LEGAL STANDARDS

During this transition period when some widely-used career interest inventories are not bias free, counselors and school officials selecting tests must be particularly concerned to examine the tests and the technical supporting materials. Legal requirements provide an initial guide to selection of tests and technical materials.

The *Title IX Regulations* set forth above impose two specific requirements on selection of tests and underlying materials: 1) that if possible, the same tests should be used for students of both sexes; 2) that if materials which require different treatment of students on the basis of sex are used, such materials cover the same occupations and interest areas, and that the use be based on a showing that it is called for to eliminate sex bias. In tests which are normed for fewer occupations for women than for men, a claim that the same occupations and interest areas are covered may be made if sufficient cross-validation material is provided. See discussion of requirement 3 from the Title IX interpretation, below. In applying these rules, the counselor must look beyond the form of the tests (virtually all of which are now unified for males and females) to determine whether the norming and scoring scales are the same.

The *Title IX Interpretation* issued by HEW (see Section I.B above) of this paper provides further rules helpful in selection of tests on the basis of their characteristics and those of the supporting technical material: 1) The supporting technical material of tests which use separate scales or norms by sex should explain

⁹Funds provided to the states under the Vocational Education Act may also be available to particular schools for programs to eliminate sex bias. Similarly, limited demonstration funds to eliminate sex bias are available under the Women's Educational Equity Act of 1974, 20 U.S.C. §1866.

Final regulations have not yet been issued under the Vocational Education Act non-bias provisions. When they are, they may provide further guidance to school counselors.

¹⁰The cases require that any selection tests not have a discriminatory impact on a protected group and if the tests do have a discriminatory impact, that they be "job-related." *Griggs v. Duke Power Co.*, 401 U.S. 424 (1971), *Dothard v. Rawlinson*, 45 U.S.L.W. 4888 (June 27, 1977). Substantial law has developed around methods used for "validation" of such tests. See, e.g., *Albermarle Paper Co. v. Moody*, 422 U.S. 405 (1975); cf. *Washington v. Davis*, 426 U.S. 229 (1976).

¹¹Any agency or organization which regulates access to the job market will be construed as covered by the requirements of Title VII. *Sibley Memorial Hospital v. Wilson*, 488 F.2d 1338 (D.C. Cir. 1973) (hospital referring private duty nurses); *Puntolillo v. New Hampshire Racing Commission*, 375 F. Supp. 1089 (D.N.H., 1974).

how such separation is essential to eliminating sex bias. Tests which have norms based on only one sex will have difficulty meeting this requirement. 2) The technical materials should clearly indicate the sex composition of the norming group for each scale. 3) The technical materials must provide evidence of validity of supporting data to interpret scores for one sex on scales normed or constructed on the basis of data from the other sex. Guidance counselors will want to reevaluate such evidence periodically to see whether it is becoming more reliable. 4) The supporting technical materials must explain how to interpret scores on norms for both sexes. These interpretation rules have the same force and effect as the Title IX regulations, and must be followed by guidance counselors and others in selection to meet the requirements of Title IX. Counselors or school officials must establish that the rules described have been met by any tests and supporting materials selected for use.

Additional requirements for test selection may be generated by state *Vocational Education Act* plans (see Section I.D of this paper above). The guidance counselor should examine the plan in effect in the state to determine what requirements have been adopted.

In addition to the legal requirements set by Title IX and the Vocational Education Act, specific *NIE Guidelines* provide helpful guidance in applying Title IX and Title IX interpretation.¹² Those guidelines suggest that the counselor making a test selection consider, as additional criteria: 1) whether the same form is used for both sexes—it should be unless separate forms are shown to be empirically more effective in minimizing sex bias; 2) that the item pools reflect experiences and activities equally familiar to both sexes, or where that is not currently possible, that they at least have a balanced number of items generally favored by each sex, and that the result is achieved within individual scales; 3) that non-biased language is used, both to describe occupations (e.g. firefighter instead of fireman) and generically (i.e., that neither “he” nor “she” is used through the inventory); 4) that the technical materials describe how the Title IX and NIE guidelines criteria are met by the test and interpretive materials. Other specific suggestions made by the NIE guidelines for evaluating the adequacy of technical materials do not so directly relate to application of the Title IX criteria, but are nevertheless important and helpful in evaluating tests. Those criteria are set forth in Appendix A of this book.

Particularly at present, when tests are being

continually revised to begin to take into account problems with sex bias, the counselor should reevaluate test selection annually to determine which tests are most effectively in compliance with legal requirements. Counselors will want to see that the test manuals indicate the date of data collection for criterion or norm groups for each occupation, so that the test selector can determine how current the information is and whether occupations and other characteristics of persons in the profession would have changed.¹³ Moreover, counselors as well as other school officials and the public should make clear to test publishers, as well as researchers and test developers, the problems which use of currently available tests present in meeting legal requirements. Such pressure, as well as detailing of the specific problems which counselors encounter in test selection, should help publishers produce better, less sex-biased tests and improved technical supporting materials. Moreover, each counselor should assure that a specific person in the school is responsible for establishing contact with HEW's Washington and regional offices so that any new regulations and interpretations of Title IX relevant to test selection will be available to the school promptly. Finally, fair test selection will be facilitated if counselors seek out, evaluate, and use supplemental test materials and new forms of tests which appear more sex-fair under the applicable laws as they become available.

School districts have a reasonable concern with establishing a record of compliance with Title IX and other relevant laws in regard to selection of tests and supporting technical information. Three steps will help assure that such compliance is obtained and documented:

First, the school should make the selection in light of the legal standards set forth above.

Second, the school should maintain records and reports on why and by what criteria particular tests were selected, including a discussion of alternatives rejected. Such record keeping is useful not only to document compliance with legal requirements, but to assure that test selection is made on an informed basis with relevant criteria in mind.

Finally, because the current time is one of transition, schools should not purchase large numbers of tests, but should maintain flexibility through repeated use of a smaller number of tests. The latter approach will assist the school in continuing to meet legal requirements as available tests and legal requirements themselves change.

¹²NIE guidelines also specify criteria for evaluating interpretive materials that accompany the tests. Although these are described as they affect the counselor's role (see Section III below), the counselor may want to evaluate the interpretive material under these NIE guidelines as part of the test selection process.

¹³NIE Guidelines regarding technical materials, Appendix A, at I.I.E.

III. THE ROLE OF THE COUNSELOR: USE OF INTERPRETIVE TEST INFORMATION TO ASSIST IN SEX-FAIR TESTING

Because all existing career interest inventories probably have some sex bias in the instrument, the guidance counselor's role is critical in providing interpretive material and guidance to students to overcome bias in the tests. Without careful counseling to meet legal requirements, most schools would have to abandon use of these tests at this time. Therefore, school districts must carefully scrutinize the role of the counselor in administering and using career interest inventories, and the counselor himself or herself must assure that essential steps are taken to provide students with a full range of career options regardless of sex.

Title IX regulations expressly require that counselors not discriminate on the basis of sex in counseling, that covered schools develop and use internal procedures for assuring that career interest inventories do not discriminate on the basis of sex, and that tests are used to provide the same career options to males and females. Those requirements can best be realized through a regularized procedure for counseling students with regard to the tests. To meet these requirements, use of a checklist on which the counselor can mark off that he or she has provided specific information to the student using the career interest inventory will assure that adequate information is communicated to the student, and will simultaneously document the communication of such information so that the school and HEW officials can monitor compliance with Title IX. In addition to using such a checklist, counselors should be conscious that they do not undermine its purpose through such negative statements as "I've told you what I have to, but you really don't want to be an auto mechanic, that's for boys"; or "Even though you've tested high on clerical skills, only girls should be secretaries."¹⁴

¹⁴The legal requirements for counselors are set forth here as part of a checklist. However, if the school or counselor chooses not to use that method, the substance is still applicable for legally required and appropriate counseling.

A number of other checklists for use by school in establishing compliance with Title IX have been developed. See e.g., Martha Matthews and Shirley McCune, *Complying With Title IX: Implementing Institutional Self-Evaluation* (U.S. Department of Health, Education, and Welfare). Those checklists are helpful for determining compliance in a variety of substantive areas, but, except for the NIE guidelines in Appendix A, are less detailed with regards to career interest inventory use than the list provided in this paper.

CHECKLIST FOR COUNSELING RELATED TO CAREER INTEREST INVENTORIES

Limits of the Tests

1. **Statement of Sex-Bias in the Instrument.** Problems of sex-bias present in existing inventories, including bias in norming groups, item choices and occupational selection should be explained to the student. That explanation will help assure bias-free counseling by prompting the student to ask questions about alternatives, and to take more seriously proposals by the counselor other than those indicated by the test scores; it also helps meet the legal requirements that students be presented the same range of career choices regardless of sex.

2. **Cultural Sex Stereotyping.** Counselors should point out that the vocational interests and choices of men and women and the development of career interests inventories based on those interests are, at this time, influenced by many environmental and cultural factors, including early socialization, traditional sex-role expectations of society, conflicts of home and family versus career and the experiences of typical women and men as members of various ethnic and social class groups.¹⁵ That explanation as well will help students to understand the use of other-sex scores and other counseling steps called for to correct test bias, and will also assure that all students more readily evaluate the same ranges of occupational choices. Therefore, such a statement is within the purview of the Title IX requirements that students of both sexes be told that persons of both sexes can enter virtually every occupation.

3. **Test Concepts.** The counselor should outline to the student the concepts of ranges of ability, the difference between interest and ability, the limits which past experiences and activities, can have on career choices and difference between interest and current knowledge about a profession or its substance. Such counseling will help assure that students who have been kept from obtaining specific knowledge or having certain experiences because of sex stereotyping will be able to pursue more non-traditional interests, as part of the opening-occupations requirements of Title IX.

Providing a Full Range of Career Choices

4. **Scores of Male and Female Scales.** If sex-separate scales and norming are used on the career interest

¹⁵For a discussion of such a statement, see NIE Guideline III, C., Appendix A of this book.

inventory chosen, students should be given the information about their results from both scales. Such information is required by the Title IX interpretation. It will also be called for to assure that a full range of career choices is made available to students regardless of sex. The counselor can also explore with the student differences in scores on same-sex and other-sex scales to illustrate the influence of sex stereotyping in past experiences.

5. Clusters of Choices. It may be helpful to the counselor to examine career choices for a student by interest and activity clusters, rather than by discrete professions.¹⁶ Since many available tests do not provide the full range of occupations for women and men, this requirement underscores the need to give students their scores on both same-sex and other-sex norms.

6. Ranking of Interests. The counselor should discuss a student's score in terms of ranking of interests rather than on the basis of absolute scores. Again, such an approach will help overcome sex bias in present tests and offer a full range of occupations to each student regardless of sex.

7. Use of Male-Normed Occupational Scales for Females. Because of the current state of the art, counselors should suggest that females who are evaluating their scores on a male-normed occupational scale somewhat discount high scores from those scales for traditionally female jobs, unless those scores are confirmed by high scores or high ranking for similar occupations on their own-sex (female) scales as well.

Attention to Test Results

8. Evaluate in Light of Students' Perceived Interests. The counselor should stress that students should evaluate the results of the career interest inventory in light of the student's own sense about career and activity interests, and that if the test does not confirm the student's interests, or seems more narrow than those interests, further exploration of career or job possibilities if called for. Only by such statement can the counselor assure that Title IX requirements are met and that bias of occupational choice present in existing inventories be overcome.

9. Other Student Experiences. The counselor should ask the student who scores high on sex-traditional jobs, or on a narrow range of jobs, whether that student had any unusual experiences or interests which suggest alternative career patterns which the student might like to try.

¹⁶ See NIE Guideline III, E., Appendix A of this book.

Counseling Back-up for Students Seeking to Try Non-Traditional Jobs

10. Back-up for the Non-Traditional Job Seeker. The counselor should provide back-up to a student who is interested in non-traditional jobs in order to meet the requirements of Title IX regulations imposed upon schools acting as employee referrers, and also to meet the Title IX requirement that a full range of occupations be made available to both males and females. Four methods of providing such back-up are:

a) stressing that most employers have affirmative action obligations for hiring and promotion of women and men in non-traditional jobs;¹⁷ b) stating that apprenticeship program sponsors and institutions or higher education may also have affirmative action obligations;¹⁸ c) noting that the counselor is available to provide advice and legal and moral support to students in confronting employers who express discriminatory policies; d) being available to discuss non-traditional jobs for the student with parents.

11. Non-Sexist Language. The counselor should assure that non-sexist language is used to describe both careers and the student's role in selecting careers. Such language is called for by the Title IX requirement that counseling be done without sex discrimination.¹⁹

12. Written Information for Students. The counselor should note that the student is being given certain written information called for by Title IX regulations and helpful to the student in assuring bias-free use of the tests. The substance of that material is discussed at Section IV of this paper below.

If counselors maintain a form checklist for transmitting the described information, and note on the checklist that each item is discussed with every student taking a career interest inventory, use of the tests if most likely to meet Title IX requirements. Also, counselors using such a checklist will have a means of documenting compliance with Title IX.²⁰

¹⁷ See, e.g., Executive Order 11246, as amended, 3 C.F.R. which requires affirmative action programs for many employers that are government contractors.

¹⁸ See, e.g., Regulations regarding Federal certification of apprenticeship programs, 29 C.F.R. Part 30, to be amended to require goals and timetables for women as well as for minorities.

¹⁹ See NIE Guidelines III, F. at Appendix A of this book.

²⁰ As states put into effect their own Vocational Education Act plans, and when Vocational Education Act regulations to eliminate sex bias are finalized, counselors will want to review the plans and regulations to determine whether they call for expansion of the counselor's checklist.

MONITORING

In addition to using a checklist to meet Title IX requirements, schools must monitor results of placements in jobs and attendance in schools of higher education on the basis of sex. Any disproportionate results should be carefully scrutinized, and if it results from sex-biased counseling, corrective action must be taken.

OTHER STEPS TO ASSURE BIAS-FREE USE OF CAREER INTEREST INVENTORIES

Although not called for by specific laws, certain additional steps will help assure that counselors are providing a bias-free context for use of career interest inventories. These steps are:

- to provide career days for students, so that they can see the availability of a range of occupations open to persons of both sexes;

- to make available to students both men and women in non-traditional jobs, so that questions can be asked and role models provided;

- to post notices informing the student that career interest inventories and employed in a bias-free manner and setting forth the steps to be used in bias-free guidance counseling. The use of such steps will provide an appropriate context for legally required bias-free counseling and increase its efficacy.

Finally, to help assure that counselors become sensitive to the difficulties and demands of bias-free counseling, some training should be made available to counselors on a district, county or state-wide basis. Use of such materials as those developed by Abt Associates for sex fairness in career guidance would be helpful. Such training would be most effective if counselors met with other counselors, and if a follow-up method for discussing hard questions in counseling were provided. Concerned schools may request such services under state Vocational Education Act plans, or from HEW. In addition, counselors should note that they can also request guidance from HEW if a question of Title IX interpretation arises.²¹

IV. INFORMATION TO BE PROVIDED TO STUDENTS

Title IX Regulations and their interpretation require that certain information be communicated to students or others seeking guidance through the career interest

inventories. In addition, the requirement that recipients develop and use internal procedures for ensuring that such testing materials do not discriminate on the basis of sex calls for supplying additional information to students. In order to assure that these provisions of Title IX requirements are met, students should be provided with such information on a routine basis—preferably on a standardized written form—as a supplement to information provided by the counselor. This procedure will provide a fallback for problems in counseling and in a crowded school will serve to assure that overworked counselors or busy students still receive important material needed for sex-fair use of career interest inventories.

Relevant information to be communicated to the student should be given in a clear form understandable to a high school student. Moreover, the counselor should urge the student to read, understand, and ask questions about the written material. Information on the sheet should include:

1. Information about how to interpret scores on both own-sex and other-sex norms with stress that there is virtually no activity or occupation which is exclusively male or female. This information must be communicated to the student to meet the Title IX interpretation requirements.

2. The student should be told whether the norming group was made up of males, females or both.

3. A report of scores on both own-sex and other-sex norms. Again, the Title IX interpretation requires the communication of such information.

4. A statement that interest scores are helpful for guidance purposes, but do not constitute selection criteria for particular employment or college training. Such a statement will assist the student to understand the counseling context in which any additional information is provided.

5. In order to place the use of a test which is not bias-free into a context which will meet the described requirements of Title IX and of the U.S. Constitution, the counselee must be told why a test which is not totally bias-free is being used. Problems of a transition period during the development of new tests should be explained, and a statement made that the school system and counselor seek to use the test in a counseling context which will reduce bias currently inherent in the instrument itself. The statement should make clear that such counseling and provision of information to students is essential to bring use of the inventories into compliance with requirements of the law that all students be given bias-free career guidance.

6. To meet the Title IX requirement that students be helped to see that every activity and occupation is open to both men and women, the material should state that

²¹ Inquiries can be marked as *Inquiries About Title IX Policy*, and addressed to the Office for Civil Rights in HEW. For addresses, see Appendix 2 of this paper.

vocational interests and choices are influenced by many factors including early socialization and sex stereotyping. Further, these factors have probably structured the experiences which the student has had in the past, and the experiences which those in the norming groups for these tests have had. Therefore, students should interpret the tests and test scores with these factors in mind.²²

7. In order to permit the student to follow developments in testing, and to understand any subsequent materials which may be given them, students should be told the name of the test which they are taking.

8. To assure that the specifications for bias-free counseling are met within the context of career interest inventories set forth at Section III of this paper above, written material for the students should set forth the elements of counseling that should be provided. Such information should summarize the requirements discussed in this chapter. By providing the counselee with such information, the school and counselor can help assure that the student will seek any information which the counselor fails to provide.²³

9. Students should be told how they can file complaints both with the school²⁴ and with HEW²⁵ if they perceive sex bias in test use and counseling about the tests.²⁶ Such a statement gives students a stake in bias-free counseling, and acts as an important check to assure that they are receiving such treatment. Particularly in an area such as use of career interest inventories, where the current state of test development requires actions by the school to supplement the tests themselves if bias is to be avoided, the backup of student concern is essential.

In addition to providing information to students, to comply with the spirit of Title IX, schools should

²² See NIE Guidelines III, C. Appendix A of this book.

²³ In those schools where counseling time is scarce, such statements to students will assure that they receive legally essential information, and will thus help the school to meet the minimum requirements of Title IX regarding use of career interest inventories.

²⁴ Under Title IX requirements, schools must establish internal grievance procedures which students have an option to use. 45 C.F.R. § 86.8.

²⁵ Title IX regulations require that schools notify students of protections against discrimination assured to them by Title IX. 45 C.F.R. § 86.9.

²⁶ As states adopt plans under the Vocational Education Act, schools will want to incorporate any specific requirements from the state plan regarding information to test use to be communicated directly to the student.

provide students with the opportunity for retesting and reevaluation of career opportunities as more bias-free tests become available.²⁷

V. REMEDIES FOR SEX BIAS IN CAREER INTEREST INVENTORIES AND THEIR USE

A. *The Role of Students and Parents*

A school system which works to assure that the guidelines set forth herein regarding test selection and use are followed should minimize sex bias in career guidance. However, students and their parents will want to monitor the use of the tests by the school's guidance counselors to assure themselves that sex bias is eliminated. A program of consistent monitoring by students and parents will alert school officials and counselors to unfairness or bias, and can create a dialogue between students, parents and school officials which will provide an important step toward broadening career opportunities for all students. A program by parents and students for monitoring school compliance with non-discrimination provisions for selection and use of career interest inventories can properly include a number of steps.

First, parents and students can review the test selection, counseling and student information procedures described herein to assure that school personnel follow them. Second, parents and students can read and evaluate the school's justifications for selecting particular career interest inventories for use in the school. Third, they can monitor results of test use by examining statistics on numbers of male and female students electing non-traditional jobs or electing college or other advanced study or apprenticeships. Fourth, parents and students can review, evaluate and inform the school and counselors about the helpfulness of counseling and interpretive materials in opening up new career suggestions which are not sex traditional. Finally, they can compare student experiences to assure that a full range of occupations is described and presented to all students regardless of sex.

Methods for conducting such monitoring include review of documents, monitoring of check lists, discussing the matter with school officials and counselors, and when problems arise, making written

²⁷ Complaints can be filed with HEW by sending a letter setting forth the name of the complainant (who can be an outside person or group, rather than the student), the name and address of the school, the specific facts of the discriminatory practice or policy, and the date when the practice or policy occurred. The letter should be addressed to the Regional Office for Civil Rights at HEW. For addresses, see Appendix 2 hereto.

reports to school officials and counselors. If corrective action is not taken promptly, parents and students will want to consider filing a complaint of discrimination under Title IX with the regional office of HEW²⁸, as well as with the state vocational educational act coordinator.

B. The Role of Counselors and School Officials

School officials and guidance counselors responsible for test selection and use may encounter certain difficulties complying with the requirements of Title IX and other laws mentioned because of the present state of test development. To ameliorate such problems, school counselors can inform test publishers of such problems with the tests; of their concerns, legal and otherwise, for having available, easy-to-use bias-free tests which are normed fairly and for which the counselors need not rely so heavily on supplementary guidance to students.

Also, school counselors should monitor job and college placements to assure through the results that sex bias is being eliminated in guidance. Although absolute equity may not be immediately achieved, an increasing level of students in jobs not traditional for their sex, and an increasing number of women and girls being directed toward college, are measures that sex bias is being eliminated in career interest inventory use.

C. The Role of Law Enforcers.

Schools, counselors, policy-makers and students are rightly concerned about assuring that schools are in compliance with Federal laws to eliminate sex bias. Compliance is subject to monitoring by the officials responsible for enforcement of the laws—in the case of Title IX, the most visible of the laws, enforcement is carried out by officials of HEW. Monitoring will occur either through HEW handling of complaints which students or others file regarding problems in the school's program, or by periodic compliance reviews conducted by federal agencies. No single procedure can assure that a school will be found in compliance with the requirements of Title IX. However, if a school assures that its counselors and other personnel are willing to meet the requirements of Title IX regulations and interpretations through meeting the guidelines set forth in this paper, it is likely that compliance will be documented and achieved.²⁹

²⁸For a discussion of the procedure to be followed in filing such a complaint, see footnote 27 above.

²⁹Compliance with state Vocational Education Act plans can similarly be documented once the school ascertains the provisions of those plans.

Three additional practices may also be helpful to schools seeking to achieve legal compliance in this area.³⁰ First, the school and counselors should maintain records of decisions and the methods used to make decisions. These should be available for inspection by students, parents and by the Federal monitor. Counselor checklists, with indications of their use for each affected student, and copies of posted notices should be maintained. Second, the school should establish a method for keeping informed of new developments in interpretation of Title IX and the Vocational Education Act by appointing a person at the school to maintain liaison with the Regional Office of HEW and with the state Vocational Education coordinator.³¹ Any new interpretations of Title IX bearing on use of career interest inventories and counseling in conjunction with such use should be discussed, and changes incorporated into existing practices. Third, the school should assure that student and parent complaints about any perceived sex bias in the use of career interest inventories are handled promptly and courteously, and that care is taken not to retaliate in any way against students making complaints.

CONCLUSION

Title IX and the Vocational Education Act, as well as other Federal laws, establish clear legal requirements for schools using career interest inventories to eliminate sex bias in their use. Because of the current state of test development, special attention must be paid to meeting the requirements of those laws during this transition period. Through following specific practices and documenting their use, school counselors can begin to assure that sex bias in use of career interest inventories is reduced or eliminated and that legal requirements for sex fairness are met.

³⁰Counselors can write to regional offices of the Office for Civil Rights in HEW. Addresses are set forth at Appendix 2 of this paper. A request to be put on a mailing list to obtain new Title IX interpretations, as well as periodic follow-up inquiries, should help assure that the counselor is made aware of such developments. Similarly, the counselor will want to maintain regular communications with the state coordinator to eliminate sex bias under the Vocational Education Act.

³¹As discussed above, schools will also want to obtain information about relevant state laws. The substance of those laws is beyond the scope of this chapter.

APPENDIX 1: COUNSELING AND GUIDANCE PROGRAMS*

Literature items on counseling and guidance programs and other activities as these are deemed to perpetuate sex bias and sex-role stereotyping in career choice and career pursuit are extensive. This is true despite the fact that a recent study has indicated that this aspect of education has been of little influence on the choices of women who are pursuing nontraditional careers in post-secondary institutions.¹ Recognizing, however, that the guidance and counseling community has been devoting more and more attention to facilitating the career choices of young people and that substantial Federal funds are and will be devoted to this end, potential checkpoints and monitorship criteria have been extracted from the literature.

In our efforts to establish a range of potential monitorship considerations, the following resources have been used: Birk,² Douglas,³ Educational Products Information Exchange,⁴ Ellis,⁵ the Massachusetts Department of Education,⁶ the National Education

Association of the United States,⁷ the North Carolina Department of Public Instruction,⁸ the Arizona Department of Education,⁹ Astin,¹⁰ the Delaware State Department of Education,¹¹ the Education Law Center Inc.,¹² the Institute for Educational Leadership,¹³ Matthews and McCune,¹⁴ the Minnesota State Department of Education,¹⁵ and the Pennsylvania Department of Education.¹⁶ From these sources, we have accumulated the following monitorship considerations:

1. Counselors are equally available to male and female students on request.
2. Male and female students or potential students

⁸North Carolina Department of Public Instruction, *Eliminating Sex Discrimination in Schools: A Source Book*. Raleigh: State Department of Public Instruction Research and Information Center, 1975, 13.

⁹Arizona Department of Education, *Suggestions for Local School District Compliance with Title IX Rules and Regulations*. Phoenix: Arizona Department of Education, 1975, 12.

¹⁰Helen S. Astin, Michele Harway and Patricia McNamara, *Sex Discrimination in Education: Access to Postsecondary Education*. Vol. 1. Washington: U.S. Department of Health, Education and Welfare, National Center for Educational Statistics, 1976, 31-33.

¹¹Delaware State Department of Education, *A Suggested Policy Guide for School Districts Prohibiting Sex Discrimination in Education*. Dover: Delaware State Department of Education, 1975, 3.

¹²Education Law Center, Inc., *Eliminating Sexism in Public Schools: A Workbook for Action*. Newark: 1976, 40-41.

¹³Institute for Educational Leadership, *Handbook on How to End Sexism in Your Schools*. Washington: The George Washington University, Third Printing, May, 1976, 4.

¹⁴Martha Matthews and Shirley McCune, *Complying with Title IX Implementing Institutional Self-Evaluation*. Washington: U.S. Department of Health, Education and Welfare, 1975-76, 15-16.

¹⁵Minnesota State Department of Education, *A Model to Eliminate Racism and Sexism in Education through the Selection, Revision and Development of the Instructional System*. St. Paul: Division of Planning and Development, Equal Educational Opportunities Section, 1975, 47-48.

¹⁶Pennsylvania Department of Education, *Self-Study Guide to Sexism in Schools*. Harrisburg: Pennsylvania Department of Education, 1975, 31.

*Joyce Cook, "Selection from Establishing Criteria for the Monitoring of Educational Activities for Sex Bias and Sex-Role Stereotyping: A Review of the Literature" (U.S. Office of Education, 1977).

¹Roslyn K. Kane, *Sex Discrimination in Education A Study of Employment Affecting Professional Personnel*, Vol. 1. Washington: U.S. Department of Health, Education and Welfare, National Center for Educational Statistics, 1976.

²Esther E. Diamond, editor, *Issues of Sex Bias and Sex-Fairness in Career Interest Measurement*. Washington: National Institute of Education, 1975, xxiii.

³Marcia Douglas, *NWREL Technical Assistance Hints for Eliminating Existent Sex Bias and Sex-Role Stereotyping and for Emphasizing Sex-Fair Guidance, Counseling, Placement and Follow-up*. Portland: Northwest Regional Educational Laboratory, 1976, 3, 5.

⁴Educational Products Information Exchange, "Sexism in Materials: How to Detect It and How to Counteract Its Effects in the Classroom," *EPIE Career Education S*E*T*, Vol. 1: *How to Select and Evaluate Instructional Materials*. New York: EPIE Institute, 1975, 20-58.

⁵Mary L. Ellis, editor, *Women at Work*. Raleigh: North Carolina State University, Center for Occupational Education, 1974, 7-11.

⁶Massachusetts Department of Education, *Title IX and Chapter 622: Compliance Guidelines for Public Schools*. Boston: Commonwealth of Massachusetts Department of Education, Undated, 5, 9.

⁷National Education Association of the United States, *Combating Discrimination in the Schools: Legal Remedies and Guidelines*. Washington: National Education Association, 1975, 25-26.

are referred to counselors in approximately equal numbers.

3. Counselors recommend programs and courses without regard to the sex of the inquiring student.
4. Career information materials have been excluded from counseling and guidance programs when they contain sex bias and sex-role stereotyping.
5. Career counseling programs provide role models of men and women in a variety of jobs and occupations (including those which are nontraditional to their sex.)
6. Men and women are equally represented on the counseling staff.
7. Interest inventories and other appraisal instruments which contain sex bias have been eliminated from use or steps have been taken to reduce the ill effects of their bias on occupational aspiration and occupational choice.
8. As great an emphasis is placed on the career choices and career decisions of women as on the same decisions of men.
9. Women and men students are provided information about their rights to equal educational and employment opportunities under the law and are provided simulated activities for dealing with sexism and discrimination.
10. Programs are planned and conducted for parents which assist them in working with their sons and daughters on career decisions, especially with respect to sex bias and sex-role stereotyping they may encounter.
12. Guidance and counseling and placement and follow-up records are maintained and are reviewed periodically for the differential impacts of the instructional, counseling and guidance, and placement programs on male and female school leavers or completers.
13. Students are informed of changing employment practices which previously operated to restrict career choice.

14. Students are encouraged to value and to develop intellectual abilities without regard to sex.

15. All students are helped to explore the advantages and disadvantages of course preferences and career choices, including such aspects as:

- The income levels associated with various skills and knowledges in the society.
- individual freedom of choice as associated with income and the various skills and knowledges in the society.
- personal satisfaction that can occur from working in areas of greatest individual interest and potential.

16. Within programs of career counseling and guidance, students are helped to:

- discuss what are "desirable human characteristics" without regard to sex.
- differentiate between their own concepts of "the ideal man" and "the ideal women" and those presented in the media.
- identify and analyze sexism in career information materials and in the media.
- differentiate between the social status of men and women as it relates to the current requirements of the labor market.
- investigate and analyze subtle forms of sex bias and sex-role stereotyping in their own daily lives.
- understand the impact of sex bias and stereotyping on each other—male and female—and on their relationships to each other.
- recognize their own sex biases and the limitations they may be imposing on themselves.

17. Special programs of counseling, guidance, placement, and peer support are provided young people who select nontraditional career and educational pursuits.

18. Equal emphasis is placed on sources of financial support for further education. Where unequal resources exist in the society for one of the sexes, that sex is provided more extensive support in identifying and securing support.

19. Guidance, counseling, and placement personnel have been provided the inservice training necessary to the delivery of sex-fair services to students.

APPENDIX 2: OFFICE FOR CIVIL RIGHTS ADDRESSES

Main Office:		Office for Civil Rights Dept. of HEW 330 Independence Ave., S.W. Washington, D.C. 20201
Region I:	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont	John F. Kennedy Federal Bldg. Government Center Boston, Mass. 02203
Region II:	New York, New Jersey, Puerto Rico, Virgin Island	Federal Building 26 Federal Plaza New York, N.Y. 10007
Region III:	Delaware, Maryland, Pennsylvania, Virginia, West Virginia, District of Columbia	3535 Market Street Philadelphia, Pa. 19101
Region IV:	Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee	50 Seventh Street, NE Atlanta, Ga. 30323
Region V:	Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin	300 South Wacker Drive Chicago, Ill. 60606
Region VI:	Arkansas, Louisiana, New Mexico, Oklahoma, Texas	1200 Main Tower Dallas, Texas 75202
Region VII:	Iowa, Kansas, Missouri, Nebraska	601 East 12th Street Kansas City, Mo. 64106
Region VIII:	Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming	1961 Stout Street Denver, Colo. 80202
Region IX:	Arizona, California, Hawaii, Nevada, Guam, Pacific Trust Territory, American Samoa	Federal Office Building 50 Fulton Street San Francisco, Calif. 94102
Region X:	Alaska, Idaho, Oregon, Washington	Arcade Plaza 1321 Second Avenue Seattle, Wash. 98101

Appendices

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Appendix A

National Institute of Education Guidelines for Assessment of Sex Bias and Sex Fairness in Career Interest Inventories

The attached guidelines have been developed as part of the National Institute of Education (NIE) Education and Work Group's study of sex bias and sex-fairness in career interest inventories. They were developed by the NIE staff and a senior consultant and nine-member planning group of experts in the fields of measurement and guidance, appointed by NIE. The draft guidelines were discussed in a broadly representative three-day workshop sponsored by NIE in Washington, D.C., in March, 1974. Through successive revised drafts, culminating in this edition of guidelines, the diverse concerns of inventory users, respondents, authors and publishers were taken into consideration and resolved as far as possible.

During the development of the guidelines, the following working definition of sex bias was used:

Within the context of career guidance, sex bias is defined as any factor that might influence a person to limit—or might cause others to limit—his or her considerations of a career solely on the basis of gender.¹

The working definition expresses the primary concern that career alternatives not be limited by bias or stereotyped sex roles in the world of work.² The guidelines represent a more specific definition than previously available of the many aspects of sex-fairness in interest inventories and related interpretive, technical, and promotional materials. The issues identified in the course of guideline development are dealt with in commissioned papers published as a book, *Issues of Sex Bias and Sex-Fairness in Career Interest Measurement*, available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 [publication number (1977) 732-269/142 1-3].

The term "career interest inventory," as used in these guidelines, refers to various formal procedures for assessing educational and vocational interests. The term includes but is not limited to nationally published inventories. The interests assessment procedures may have been developed for a variety of purposes and for use in a variety of settings. The settings include educational and employment-related settings, among others, and the uses include career counseling, career exploration, and employee selection (although the latter may also involve other issues of sex bias in addition to those discussed here).

The guidelines do not represent legal requirements. They are intended as standards a) to which we believe developers and publishers should adhere in their inventories and in the technical and interpretive materials that the American Psychological Association (APA) *Standards for Educational and Psychological Tests* (1974) requires them to produce, and b) by which users should evaluate the sex-fairness of available inventories. There are many essential guidelines for interest inventories in addition to those relating to sex-fairness. The guidelines presented here do not replace concerns for fairness with regard to various ethnic or socioeconomic subgroups. The guidelines are not a substitute for statutes or federal regulations such as the Equal Employment Opportunity Commission (EEOC) selection guidelines (1970) and Title IX of the Education Amendments of 1972 (1972), or for other technical requirements for tests and inventories such as those found in the APA standards. The guidelines thus represent standards with respect to sex-fairness, which supplement these other standards.

The guidelines address interest inventories and related services and materials. However, sex bias can enter the career exploration or decision process in many ways other than through interest inventory materials. Several of the guidelines have clear implications for other materials and processes related to career counseling, career exploration, and career decision-making. The spirit of the guidelines should be applied to all parts of these processes.

The guidelines are presented here in three sections: I, The Inventory Itself; II, Technical Information; III, Interpretive Information.

I. The Inventory Itself

- A. The same interest inventory form should be used for both males and females unless it is shown empirically that separate forms are more effective in minimizing sex bias.
- B. Scores on all occupations and interest areas covered by the inventory should be given for both males and females, with the sex composition of norms—i.e., whether male, female, or combined sex norms—for each scale clearly indicated.
- C. Insofar as possible, item pools should reflect experiences and activities equally familiar to both females and males. In instances where this is not currently possible, a minimum requirement is that the number of items generally favored by each sex be balanced. Further, it is desirable that the balance of items favored by sex be achieved within individual scales, within the limitations imposed by validity considerations.

- D. Occupational titles used in the inventory should be presented in gender-neutral terms (e.g., letter carrier instead of mailman), or both male and female titles should be presented (e.g., actor/actress).
- E. Use of the generic "he" or "she" should be eliminated throughout the inventory.

II. Technical Information

- A. Technical materials provided by the publisher should describe how and to what extent these guidelines have been met in the inventory and supporting materials.
- B. Technical information should provide the rationale for either separate scales by sex or combined-sex scales (e.g., critical differences in male-female response rates that affect the validity of the scales vs. similarity of response rates that justify combining data from males and females into a single scale).
- C. Even if it is empirically demonstrated that separate inventory forms are more effective in minimizing sex bias, thus justifying their use, the same vocational areas should be indicated for each sex.
- D. Sex composition of the criterion and norm groups should be included in descriptions of these groups. Furthermore, reporting of scores for one sex on scales normed or constructed on the basis of data from the other sex should be supported by evidence of validity—if not for each scale, then by a pattern of evidence of validity established for males and females scored on pairs of similar scales (male-normed and female-normed, for the same occupation).
- E. Criterion groups, norms, and other relevant data (e.g., validity, reliability, item response rates) should be examined at least every five years to determine the need for updating. New data may be required as occupations change or as sex and other characteristics of persons entering occupations change. Text manuals should clearly label the date of data collection for criterion or norm groups for each occupation.
- F. Technical materials should include information about how suggested or implied career options (e.g., options suggested by the highest scores on the inventory) are distributed for samples of typical respondents of each sex.
- G. Steps should be taken to investigate the validity of interest inventories for minority groups (differentiated by sex). Publishers should describe comparative studies and should clearly indicate whether differences were found between groups.

III. Interpretive Information

- A. The user's manual provided by the publisher should

describe how and to what extent these guidelines have been met in the inventory and the supporting materials.

- B. Interpretive materials for test users and respondents (manuals, profiles, leaflets, etc.) should explain how to interpret scores resulting from separate or combined male and female norms or criterion groups.
- C. Interpretive materials for interest inventory scores should point out that the vocational interests and choices of men and women are influenced by many environmental and cultural factors, including early socialization, traditional sex-role expectations of society, home-versus-career conflict, and the experiences typical of women and men as members of various ethnic and social class groups.
- D. Manuals should recommend that the inventory be accompanied by orientation dealing with possible influences of factors in C above on men's and women's scores. Such orientation should encourage respondents to examine stereotypic "sets" toward activities and occupations and should help respondents to see that there is virtually no activity or occupation that is exclusively male or female.
- E. Interpretive materials for inventories that use homogeneous scales, such as health and mechanical, should encourage both sexes to look at all career and educational options, not just those traditionally associated with their sex group, within the broad areas in which their highest scores fall.
- F. Occupational titles used in the interpretive materials and in the interpretation session should be stated in gender-neutral terms (e.g., letter carrier instead of mailman) or both male and female titles should be presented (e.g., actor/actress).
- G. The written discussions in the interpretive materials (as well as all inventory text) should be stated in a way which overcomes the impression presently embedded in the English language that a) people in general are of the male gender, and b) certain social roles are automatically sex-linked.
- H. The user's manual a) should state clearly that all jobs are appropriate for qualified persons of either sex; and b) should attempt to dispel myths about women and men in the world of work that are based on sex-role stereotypes. Furthermore, ethnic occupational stereotypes should not be reinforced.
- I. The user's manual should address possible user biases in regard to sex roles and to their possible interaction with age, ethnic group, and social class, and should caution against transmitting these biases to the respondent or reinforcing the respondent's own biases.
- J. Where differences in validity have been found between dominant and minority groups (differentiated by sex), the user's manual should explain how these differences have been met in the inventory and the supporting materials.

ated by sex), separate interpretive procedures and materials should be provided that take these differences into account.

- K. Interpretive materials for respondent and user should encourage exploratory experiences in areas where interests have not had a chance to develop.
- L. Interpretive materials for persons re-entering paid employment or education and persons changing careers should give special attention to score interpretation in terms of the effects of years of stereotyping and home-career conflict, the norms on which the scores are based, and the options such individuals might explore on the basis of current goals and past experiences and activities.
- M. Case studies and examples presented in the interpretive materials should represent men and women equally and should include but not be limited to examples of each in a variety of non-stereotypic roles. Case studies and examples of mature men and women and of men and women in different social class and ethnic groups should also be included where applicable.
- N. Both user's manuals and respondent's materials should make it clear that interest inventory scores provide only one kind of helpful information, and that this information should always be considered together with other relevant information—skills, accomplishments, favored activities, experiences, hobbies, influences, other test scores, and the like—in making any career decision. However, the possible biases of these variables should also be taken into consideration.

FOOTNOTES

¹ For a comprehensive analysis of the many forms in which sex bias appears in written materials, the reader is referred to the guidelines of Scott, Foresman and Co. (1972).

² An alternative interpretation of sex bias has been suggested by Dale Prediger and Gary Hanson. It defines sex restrictiveness in interest inventory reporting procedures and indicates under

what conditions sex restrictiveness is evidence of sex bias. In summary, it can be stated as follows:

An interest inventory is sex-restrictive to the degree that the distribution of career options suggested to males and females as a result of the application of scoring or interpretation procedures used or advocated by the publisher is not equivalent for the two sexes. Conversely, an interest inventory is not sex-restrictive if each career option covered by the inventory is suggested to similar proportions of males and females. A sex-restrictive inventory can be considered to be sex-biased unless the publisher demonstrates that sex-restrictiveness is a necessary concomitant of validity.

Still another interpretation has been suggested by John L. Holland:

An inventory is unbiased when its experimental effects on female and male respondents are similar and of about the same magnitude—that is, when a person acquires more vocational options, becomes more certain, or learns more about himself (herself) and the world of work . . . The principles can be extended to any area of bias by asking what differences proposed revisions of inventories, books, teacher and counselor training would make.

A fuller explanation of both of these interpretations appears in Diamond, E., editor, *Issues of Sex Bias and Sex Fairness in Career Interest Measurement*, Washington: National Institute of Education, 1975.

REFERENCES

- American Psychological Association. *Standards for Educational Psychological Tests*. Washington: American Psychological Association, 1974. Available from the American Psychological Association, 1200 17th St., N.W., Washington, D.C. 20036. \$5.00 for non-members; \$3.00 for members.
- Equal Employment Opportunity Commission. "Guidelines on Employee Selection Procedures." *Federal Register*, Vol. 35, No. 149.
- Diamond, Esther E., editor. *Issues of Sex Bias and Sex Fairness in Career Interest Measurement*. Washington: U.S. Government Printing Office, 1975.
- Scott, Foresman and Co., *Guidelines for Improving the Image of Women in Textbooks*. Glenview: 1972. Available from Scott, Foresman and Co., 1900 East Lake Ave., Glenview, Ill. 60025.
- Title IX, Education Amendments of 1972, Public Law 92-318, June 23, 1972.

Appendix B

Illustration and Interpretation of the NIE Guidelines for Assessment of Sex Bias and Sex-Fairness in Career Interest Inventories*

INTRODUCTION

As part of the National Institute of Education (NIE) Education and Work Group study of sex bias and sex-fairness in career interest inventories, 26 guidelines were developed as standards of sex-fairness for publishers and users. These guidelines represent the diverse concerns of inventory users, respondents, authors and publishers. In order to make the guidelines more readily interpretable to counselors and other inventory users, the original 26 guidelines (which are presented in Appendix A of this book above) have been combined into 15 areas for discussion here. The combined guidelines and recommendations cover the three facets of career guidance inventories in which sex bias may occur:

- The items themselves;
- The technical procedures and materials; and
- The interpretive materials.

The *guidelines* are designed to help counselors and others to recognize sex bias in inventories; the *recommendations* which follow each set of guidelines are designed to help counselors minimize the effects of sex bias when it is found.

Guidelines for Recognizing Sex Bias in Inventories

The NIE guidelines for assessment of inventories identify two areas where sex bias can occur:

- The test items themselves (Guidelines 1 and 2); and
- Forms available for administration (Guideline 3).

Following the guidelines are two recommendations which make suggestions to eliminate sex bias in the use of career interest inventories:

- Administer inventories only as part of a total program (Recommendation 1); and
- Use a combined inventory form (Recommendation 2).

GUIDELINE 1: Items involving occupational titles

*Adapted with permission from *Sex Fairness in Career Guidance: A Learning Kit*. Cambridge: Abt Associates, 1975.

should either use gender-neutral terms or present both male and female titles. The generic "he" or "she" should also be avoided.

Example:

Would you like to:

Biased— Watch firemen at work?

Fair— Watch firefighters at work?

Biased— Spend a day observing a mailman?

Fair— Spend a day observing a letter carrier?

Biased— Conduct an interview with a famous actor?

Fair— Conduct an interview with a famous actor or actress?

Biased— Observe a doctor conduct his rounds?

Fair— Observe a doctor conduct his or her rounds?

Rationale: Using the generic "he" or "she" or the masculine or feminine form in reference to an occupation reinforces the idea that clients are expected to choose only those occupations that have in the past traditionally been chosen by members of their particular sex. Automatic exclusion of certain occupations from the realm of acceptability for men or women can be avoided by deleting or revising all phrasing that equates a job with only one sex.

GUIDELINE 2: Item pools should reflect experiences and activities equally familiar to both sexes, or at least be balanced in terms of the numbers of items favored by each sex. The balancing should be achieved within individual scales, within the limitations imposed by validity considerations.

Example: A pool of items designed to assess social interests ideally would include activities equally familiar to both sexes, such as writing letters and making friends. A "male-oriented" item, such as attending a hockey game, should be balanced with a "female-oriented" item, like attending a card party.

Rationale: Using more items which favor responses from one sex as opposed to the other affects the outcome which an inventory can provide. This is true for both the inventory as a whole and for each scale within the inventory. The problem is that many items reflect

socialization experiences. For example, if the question is "Would you like to operate a sewing machine?", more women are likely to respond positively than men. This is probably due to the years of societal expectations which have guided more women than men into activities and interest which pertain to sewing. Men, on the other hand, are more likely to respond positively to other items which reflect their socialization experiences, such as "Would you like to repair an automobile?". Test constructors maintain that the sex differences in item response rates are due to aspects of socialization over which they have no control. In addition, some feel that these differences in response rates are important in determining who has an interest in a certain area. Some critics (Prediger and Cole, 1975) contend that a greater effort should be made to determine empirically which items are effective in discriminating a specific interest from other types of interests, and which also reflect experiences common to both sexes. For example, "Would you like to go to a movie?" would be likely to tap experiences common to both sexes. The test constructor would need to determine empirically whether the item was effective in measuring a specific type of interest. A less desirable alternative to designing gender neutral items is to insure that the items which reflect experiences and activities that are common to one sex are balanced with items favoring the other sex. Whichever approach is selected should be supported by a discussion in the technical materials.

GUIDELINE 3. The same interest inventory form should be used for both males and females unless it is shown empirically that separate forms are more effective in minimizing sex bias.

Clarification: The interest inventory should ideally have one form for all clients. If separate forms are provided, the technical materials should show how this procedure reduces sex bias.

Rationale: Separate forms are based on the implicit assumption that men's and women's occupational roles are different enough to require separate sets of interest inventory items. The growing concern for equal career opportunity for both sexes, however, has focused attention on the need for common forms reflecting a commonality of interests and occupational roles. At present most interest inventories do not make use of a common form with a single set of items for both sexes. Use of interest inventories with one form for all clients is an important way of expanding clients' awareness of the fact that women and men are free to pursue all occupational interests, not only those traditionally associated with their own sex.

RECOMMENDATIONS FOR ADMINISTERING THE INVENTORY

RECOMMENDATION 1: Administer career interest inventories only as part of a total program of career guidance.

Ideally, counselors should select inventories which are sex-fair in language and content. Whether or not the inventory itself is sex-biased, however, clients may respond to it in a biased fashion. That is, regardless of the language of the items, clients may be reluctant to express interest in occupations which, in their minds, "belong" exclusively to men or exclusively to women. If career guidance materials are utilized as part of a comprehensive program of career guidance, clients may be more apt to respond in a manner that is free of sex role stereotypes. As a minimum, an orientation session is recommended. Preferably, such activities should take place at least a week prior to inventory administration. The primary purpose of orientation sessions should be to examine stereotyped values and to enforce the notion that persons of both sexes are free to express interest in any occupation or activity. No occupational interest should be rejected as inappropriate or unattainable simply because it has traditionally been pursued by members of the opposite sex.

Summary of Steps for Recommendation 1: Administer Inventories Only as Part of a Total Program

1. Utilize inventories as a tool in a comprehensive program of career guidance.
2. Conduct orientation sessions at least one week prior to inventory administration.
3. Help clients become aware of their own stereotyped attitudes and values, as well as the increasing occupational opportunities for both sexes.

RECOMMENDATION 2: Use an inventory that has a combined form for males and females wherever possible; if you must use an instrument with separate forms for males and females, try to administer both.

Given recent developments in the career guidance area, there should be no difficulty in finding a suitable instrument having a combined form for both sexes. If an earlier instrument with separate forms for males and females *must* be used—due to a stockpile of materials, an ongoing research project demanding use of the same instruments over time, or some other reason—

administration of both male and female forms to each client may reduce potential sex bias. It should be recognized that this recommendation, (i.e., administering both forms) is subject to speculation. There has been very little empirical research concerning using male forms with female clients. Although it may take a longer period of time to administer both forms, the benefits in terms of stimulating exploration and expanding choices may be worth it. Otherwise, the use of a particular form may restrict a respondent's choices to those traditionally associated with the respondent's own sex. Use of both forms may be especially beneficial for the career-oriented female. There is some evidence that the female form of an occupational inventory may not show good differentiation of interests for the majority of women (Super and Crites, 1962; Huth, 1973). There seems to be a commonality of interests among women—at least as measured by currently used inventories—that makes differentiation difficult in those cases in which women do not have clear-cut vocational preferences. All too often, the female form of the inventory reflects a family versus career orientation, rather than a well-defined occupational profile. For the career-oriented woman, the male form of the inventory or male-normed scales, as well as the female form, may assist in providing an adequate differentiation of occupational interests. If there is not time to administer both, the male form may be preferable, particularly if it provides a wider range of occupational options when scored. (See Guideline 5 for consideration of the appropriate use of this recommendation.)

Summary of Steps for Recommendation 2: Using a Combined Inventory Form

1. Use an inventory with a common form for men and women wherever possible.
2. If you must use an inventory with separate forms, try to administer both, especially when counseling career-oriented women.
3. If there is not time to administer both, administer the male form.

Guidelines for Recognizing Sex Bias in the Technical Procedures and Materials

In addition to being part of the inventory itself, sex bias can enter in the following areas of technical development and preparation of technical materials:

- The process of scale construction (Guideline 4),
- The process of developing norms for the scales

(Guidelines 5 and 6), and

- The discussion in the technical materials (Guidelines 7 and 8).

Following the guidelines, four recommendations are included which pertain to:

- Reporting scores based on both male and female scales. (Recommendation 3)
- Reporting both sets of scores, wherever possible. (Recommendation 4)
- Filling in the appropriate sex code. (Recommendation 5)
- Reporting scores based on special norm groups. (Recommendation 6)

GUIDELINE 4: Technical Information should provide the rationale for either separate scales by sex or combined-sex scales.

Clarification: The technical information should either (1) present the critical differences in male-female response rates that justify separating scales by sex and clearly identify the sex on which the separate scales are normed, (2) present the similarities in response rates that justify combining data from males and females into a single scale.

Rationale: In general, this issue pertains to the development of scales for *occupational inventories*. Items in these inventories are selected because of their ability to distinguish between people employed in an occupation and people-in-general. Some evidence indicates that both men and women employed in a given occupation typically express similar interest while the interests of men- and women-in-general may be very different (Johansson and Harmon, 1972). Thus, an item which separates men in an occupation from men-in-general may not separate women in the same occupation from women-in-general. Consider the following hypothetical example:

Responses Rates to the Question "Would you like to race automobiles?"

Response	Response Rate	
	Male race drivers	Female race drivers
Like	95%	95%
Indifferent	5%	5%
Dislike	0%	0%
	Men-in-general	Women-in-general
Like	75%	10%
Indifferent	20%	10%
Dislike	5%	80%

When a male responds "like" to the item, we know very little about what distinguishes him from male "race drivers." When a female responds positively, she has selected an unusual response, suggesting that she has interests different from those of women-in-general and similar to those of female "race drivers." Consequently, other items might be required to measure effectively male "race driver" interest and the male and female scales might necessarily differ.

Other evidence, however, indicates that even men and women in the same occupations may have different patterns of interest (Prediger and Hanson, 1976). Some of the conflict between the Johannson and Harmon (1972) and Prediger and Hanson (1976) research results may be due to the fact they did not use the same interest inventories. What becomes clear when the conflict is examined is that technical information should be presented which justifies the approach taken.

Separate scales for males and females rarely occur on basic interest inventories since the purpose is to identify broad areas of interest which are common to various kinds of people. The norms for males and females, however, usually differ. Consequently, the counselor should be familiar with technical supporting materials for both types of inventories.

To determine whether the scales have been constructed in a way to minimize sex bias the counselor should:

- Examine the technical materials for a presentation of the differences and similarities in male-female response rates to items in the inventory;
- Determine whether the validity data justify separate-sex scales, based on "significantly" large differences in male-female response rates. (The technical materials should provide a discussion of the size of the difference that makes a "difference.")
- If large differences are shown using a single scale, determine whether the reporting format, such as a profile, compensates for these differences. For example, if there is a single Mechanical scale and a single score for both sexes is calculated on a combined norm group, interpretive norms should be presented to indicate how a female client compares with a female norm group and a male norm group on the scale.

GUIDELINE 5: Scores on all occupations and interest areas covered by the inventory should be given for both males and females, with the sex composition of the

norm or criterion group—i.e., whether male, female, or both—for each scale clearly indicated.

Even if it is empirically demonstrated that separate scales are more effective in minimizing sex bias, thus justifying their use, the same vocational areas should be indicated on the report for each sex.

Furthermore, reporting of scores for one sex on scales normed or constructed on the basis of data from the other sex should be supported by evidence of validity.

Clarification: There are three key points in this guideline: (1) scores on all interest areas covered by the inventory should be available for both sexes. The scores do not have to be referenced against opposite-sex norms; (2) score reports should clearly indicate the reference group; and (3) if opposite-sex scores are reported, there must be a clear and justified demonstration that this is an appropriate procedure.

Rationale: When scales are differentiated on the basis of sex, and some scales are available to only females or males, career options may be unnecessarily limited as a result of the inventory outcome. Separate scales may lead to two kinds of restrictions:

- Restriction of the scope or range of choices available to an individual
- Restriction of the level of choice.

In the former case, persons are limited in the number of areas or fields which they can pursue. For example, males may be excluded from considering domestic or clerical jobs, women from considering mechanical or technical occupations. Restriction of level means that persons are limited in the depth which they can pursue a given occupational area. Some inventories, for example, may offer males a wider sampling of professional occupations requiring a great deal of training—such as biologist, physician, and lawyer. Females, on the other hand, may be offered a greater number of entry-level or assistant-level jobs requiring less training and with less opportunity for advancement—such as medical technician, nurse, or legal secretary.

In either case, differentiated inventory scales may serve to reinforce sex-role stereotypes and close off career options for reasons other than aptitude, interest, or demonstrated ability. A full spectrum of career options must be available for both sexes if interest inventories are to be instrumental in encouraging all clients to explore career opportunities freely.

At present, interest inventories utilize different methods for calculating scores for the scales: (1) some provide scores for males and females comparing all

clients' scores with a combined-sex norm group; (2) some provide scores for males and females comparing clients' scores against only the same-sex norm group, i.e., females are scored only on scales normed for females; (3) some provide scores for males and females comparing clients' scores against norms for all scales, even though some scales are normed with groups of males and others are normed with groups of females; and (4) some provide a combination of (1) and (3) above.

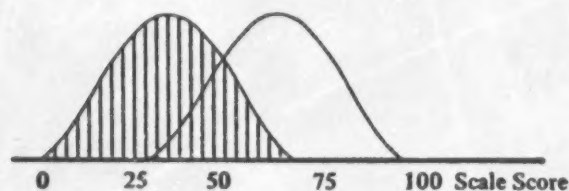
Establishing the sex composition of the criterion and norm groups is the primary basis for understanding the meaning of a client's score in comparison to the reference group. Therefore the sex composition of the reference group must be clearly specified.

That is, in the case of *occupational inventories*, the technical materials should clearly indicate the sex composition of the groups of people employed in particular occupations (the criterion groups). In the case of *basic interest inventories*, where a criterion group is not used, the sex composition of the norm group should be specified.

Many occupational and basic interest inventories now report all scores, developed or named on either sex, to each client. The problem is now one of interpretation. In general, use of opposite-sex scales is appropriate if differences between mean male and female scores on a specific scale are minimal, and if correlations between scores based on male-normed and female-normed scales for the same occupations are reasonably high. In either case, data should be presented (and problems of interpretation discussed) which show what differences can be expected for individual scores on a male "Physician" scale and a female "Physician" scale, on a female "Guidance Counselor" scale and a male "Guidance Counselor" scale, on a male "Telephone Operator" scale and female "Telephone Operator" scale, etc.

GUIDELINE 6: Technical materials should include information about how suggested or implied career options (i.e., options suggested by the highest scores on the inventory) are distributed for samples of typical respondents of each sex.

Example: The technical materials provide score distributions for sample groups of males and females on each scale. This could be shown for a scale called "Military Officer" (male) as follows:



Rationale: When scores on opposite-sex scales, such as the one above are used, it is not possible to know whether a score of 45 is high or low for females unless it is known how females usually score on "Military Officer" (male). Only when the technical materials provide these distributions, as in the example above, is it possible to interpret the score of 45. It is further important to know whether males generally score higher on "Military Officer" (female) than on a scale developed on a male criterion sample. This might occur if the items which compose the female scale are the ones to which males are more likely to respond positively. In such a case, a male could score high on "Military Officer" (female) but the score would be quite meaningless.

GUIDELINE 7: Technical materials provided by the publishers should describe the efforts made in the inventory to eliminate sex bias and indicate how recently criterion groups, norms, and other relevant data for each occupation have been updated.

Clarification: The technical reports from the publisher should contain information to statements to the effect that they have made efforts to eliminate sex bias and produce a sex-fair interest inventory. The test manual should also clearly specify the year of data collection for each criterion and norm group. Further, the publisher's technical information should discuss the continued relevance of "old" data, that is, data collected (on criterion groups) more than 5 years ago.

Rationale: Publishers are currently very aware of the issue of sex bias as it pertains to career guidance materials in general, and to their inventories specifically. Further, publishers are becoming increasingly responsive to these issues. Evidence of responsiveness might include a presentation in the technical materials on response differences of males and females to the inventory and a discussion of how these differences can be utilized in interpreting interest inventories.

An occupational or interest inventory may require updating because of general changes in basic interests over time, changes in the interests of certain groups over time (e.g., criterion groups such as life insurance salespersonnel and ministers), or significant changes in the way items differentiate sexes over time. The effect of time on an occupational criterion group, such as lawyers, which is experiencing a marked change in the sex ratio, also needs to be explored. In general, if validity data are 5 or more years old, the manual should provide evidence that the scores are still meaningful today.

GUIDELINE 8: Steps should be taken to investigate the

validity of interest inventories for minority groups (differentiated by sex). Publishers should describe comparative studies and should clearly indicate whether differences have been found between groups.

Rationale: At present, interest inventories present very little information about the validity of the inventories when used by clients from minority groups. The technical manual should provide information to establish the validity of the inventory's scores for ethnic and racial groups not included in the criterion and norm samples. This requires comparative studies to identify whether the criterion or norm groups differ from special groups (minority, etc.) in the scores they receive on interest inventory scales. Even though some differences may exist for some scales, there may be little or no loss in validity for the entire inventory. This depends on the overall score distribution for the minority group. If, for example, minority respondents tend to receive high scores on more manual types of occupations and low scores on professional and technical types of occupations, when compared with a non-minority group of respondents, one might have cause to suspect bias. If, however, one finds that, on the average, minority respondents score 5 points higher on *all* scales, the validity of the scales for the minority population would be comparable to the validity of the scales for the population represented by the criterion samples. But the norms for the majority group would no longer be appropriate.

Recommendations for Reporting Inventory Results

RECOMMENDATION 3: When scales cover different vocational areas for males and for females, scores on both sets of scales should be reported to insure that all vocational areas are covered.

There is a great deal of controversy over the appropriateness of using scales developed for one sex with persons of the opposite sex. While some recommend the use of opposite-sex scales, much more information is needed to definitely support this procedure. Those who disagree with this procedure generally question the accuracy or validity of scores based on opposite-sex scales where either no reference group of that sex is available or males and females have been found to respond differently to items making up the scales. For example, questions are raised about what to do if a woman scores lower on all professional (opposite-sex) scales. Even though there are some judgmental approaches which can be applied, such as Recommendation 3b, the issue still remains. Harmon

(1974) presents a detailed discussion of reasons for not using opposite-sex scales.

Despite these concerns, there are several reasons for recommending reporting of scores for each person on all scales:

- When male/female scales cover different occupational or interest areas, reporting of scores for one sex only may result in limiting the scope and/or levels of choices available to the client.
- Until sex is no longer a factor in the world of work, clients may need to know how their interests compare to those of persons in a primarily male or primarily female field.
- While concentrating on same-sex scores, by pointing out scores on opposite-sex scales, the counselor may help bring an end to the consideration of sex in vocational choice. Clients may, perhaps for the first time, give at least passing thought to what it would be like to work in what has heretofore been an alien environment—an occupation dominated by the other sex. This kind of musing on the part of the individual is where societal change must start (Campbell, 1974, p. 20).
- Finally, there is some empirical evidence which suggests that, while the reporting of scores on opposite-sex scales is not totally justified, in most cases it is not as technically unsound as had been assumed (Cole, 1973; Hornaday and Kuder, 1961; Kuder, 1975; Darley and Hagenah, 1955; Laime and Zytowski, 1964; Campbell, 1974; Johansson, 1974).

For these reasons, the reporting of scores on opposite-sex scales is recommended. Note, however, that the recommendation includes an important point: the reference group must be clearly identified in the technical materials. Recommendations 3a through 3c offer three corollary suggestions which, if used properly, will help insure that reporting opposite-sex scores serves to reduce sex bias in interest inventory results, rather than introduce distortion.

RECOMMENDATION 3a: When both male and female scales cover the same occupational area primary focus should be placed on scores based on same-sex scales.

While the research evidence suggests a great deal of similarity between scales developed on male and female criterion groups, such scales are not completely

interchangeable. When both male and female scales cover the same area—such as law or engineering—scales based on male criterion groups will usually work best for males, and scales based on female criterion groups will usually work best for females. However, this does not preclude using scores based on opposite-sex scales to supplement the information provided to the client. Moreover, when only the opposite-sex scale covers a given occupational area—such as nursing or electrical repair work—scores based on these scales should be reported if sexual restrictiveness is to be minimized.

RECOMMENDATION 3b: In reporting scores on opposite-sex scales, focus more on the pattern of scores than on the intensity or level of scores.

Research suggests that the pattern of interests for men and women may be similar and that a profile of scores based on scales developed for one sex may correspond fairly well to the profile of scores based on scales developed for the other sex. However, the level of intensity of scores may "differ considerably" (Kuder, 1975). For example, a female client's highest scores on an occupational inventory might be in the medical service area on both the female and male scales. The profile might look something like this:

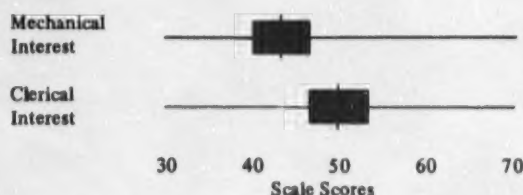
OCCUPATIONAL SCALES FEMALE NORMS		OCCUPATIONAL SCALES MALE NORMS	
Physical			
Therapist	.48	Physician	.37
Nurse	.47	Dentist	.35
Occupational			
Therapist	.45	Optometrist	.35
Dental Aast.	.40	Pharmacist	.32
		Psychology	
Psychologist	.38	Professor	.30

This client's five top scores are higher on the female scales—ranging from .38 to .48—than on the male scales—ranging from .30 to .37. Her interests are more consistent with those of the female reference group. Yet the pattern of scores is similar across both sets of scales. In both cases, her five highest scores are in the field of medicine. By looking at the pattern of interests on opposite-sex scales—how the scores rank in reference to each other—rather than the level of scores, one may obtain a more accurate picture of a person's interests. That is, all ten occupations are worth this client's consideration.

Looking at a pattern of scores requires the counselor's knowing when a difference really makes a difference—e.g., how much higher a client's measured mechanical interest must be than her or his clerical

interest before one can say she or he is more interested in one than the other. Essentially, the question here centers around the standard error, or reliability of measurement, for the inventory. In general, the more reliable the test, the smaller the error of measurement. Because tests are not absolutely reliable, we assume that the score a person obtains is not necessarily an exact or "true" score.

Consider the example below, in which a client obtains a score of 45 on a "Mechanical" scale and 52 on a "Clerical" scale. The standard error of measurement is 10.



Each score here is represented by a bar instead of a point, the bar indicating the obtained score $\pm$ one standard error. Although the midpoint of the "Mechanical" interest bar is below the midpoint of the "Clerical" interest bar, the two bars overlap. The differences does not represent an important difference. Where there is considerable overlap of the bars, the difference is probably not significant.

The specific application of this recommendation to particular inventories will vary. Many inventories use a "band" or "bar" approach to score description. Others provide the test interpreter with a ready-made estimate for determining the range of scores included within a specified number of standard error of measurement units. Counselors will want to be thoroughly familiar with both the report format and the technical and interpretive materials accompanying the inventories they utilize.

RECOMMENDATION 3c: In reporting scores on opposite-sex scales, beware of spuriously high or low scores which may reflect sex role stereotypes rather than basic interest patterns.

In order to follow this recommendation, the counselor must be extremely familiar with both the types of inventory items composing the scales and the client. We have proposed using opposite-sex scales primarily to identify client interest in those occupational areas not covered by scales for the appropriate sex. Such areas are typically those which have been traditionally restricted to one sex or the other, and the items making

up such scales may well reflect sexual stereotypes. How a client responds to these items may be affected by early socialization experiences.

There is often a greater disparity between male and female scores on scales containing sex-linked items than on scales containing sex-free items. Males tend to score higher on female scales dominated by "male" types of items, such as the female scales for "Army Officer", than on the corresponding male scale, while females tend to score higher on male scales dominated by "female" types of items, such as the male scale for "Musician" (Campbell, 1974). "When these opposite-sex scales are used, they should be interpreted with sexual stereotypes, and their potential effect on scores, kept in mind" (Johansson, 1974).

Knowing the potential effect of such influences on a client's scores is only half the task for the counselor. She or he must also understand the client in order to determine whether these scores do in fact reveal more about sexual stereotypes or occupational preferences. The reporting of scores is the first step in the counselor process; awareness of potential bias and interpreting the scores in the light of that bias is the second step. Interpretation involves many facets which will be explored more fully in recommendations 7 through 12.

**Summary of Steps for
Recommendation 3:
Reporting Scores Based on
Both Male and Female Scores**

1. When both male and female scales cover the same occupational/interest area, focus on the appropriate sex scores, using opposite sex scores as supplementary information only.
2. When an occupational area is covered by scales for one sex only, use opposite-sex scales to eliminate possible restrictiveness in the inventory.
3. Look at the pattern rather than the level of scores on opposite-sex scales.
4. Know the *items* in the scales and the *client* in order to avoid utilizing scores on opposite-sex scales which reflect sex role stereotypes rather than valid interest patterns.
5. Study recommendations 7 through 12 which present additional suggestions for interpreting scores on both same-and opposite-sex scales.

RECOMMENDATION 4: When an inventory provides two sets of sources—one based on male norms—both sets

of scores should be reported, with the appropriate reference group clearly indicated.

When two sets of scores are available to the client, be certain to include both sets in the discussion and interpretation. For methods of doing so, refer to Recommendation 3, which discusses reporting scores on both male and female scales.

RECOMMENDATION 5: Instruct clients to fill in the appropriate sex code, or no sex code, on their answer sheets to maximize the information reported to them.

To insure that clients receive all scores available to them, clients must often mark the sex code on the inventory answer sheet in a particular manner. For those inventories yielding only same-sex scores, filling in the client's sex in the appropriate space on the answer sheet will usually guarantee receiving the appropriate set of scores. For some of the inventories which provide scores based on both same-sex and opposite-sex norms this procedure will also result in the reporting of both sets of scores. For others of this kind, however, failure to indicate the respondents' sex will yield both sets of scores.

The counselor must be familiar with the types of scores available for each inventory and the appropriate procedure to be followed to make certain that clients receive all of them. Explicit instructions should be given to the client, who may be reluctant to fill in the sex code, as to how to mark his or her answer sheet to guarantee that maximum information is obtained.

At first glance, these instructions may appear to call unnecessary attention to differences between the sexes. Until such considerations no longer play a part in the development and reporting of results from career guidance inventories, however, such directions may be essential in insuring that inventory results are maximally useful.

**Summary of Steps for
Recommendation 5:
Filling in the
Appropriate Sex Code**

1. Identify the types of scores available for the inventory.
2. Determine which coding procedure will maximize the information reported.
3. Instruct the client to fill in her or his answer sheet to maximize the information reported.

RECOMMENDATION 6: When an inventory provides

separate norms for special groups, scores should be provided based on those norms wherever appropriate, with the appropriate reference group(s) clearly indicated.

Certain inventories provide only one set of scores, for example, scores based on the grade and sex of the respondent. Others provide a number of reference groups against which a client's scores can be compared. We have already discussed the use of the same- and opposite-sex scores. Scores may also be available by age, education, geographic location, ethnicity, or other characteristics of the respondent.

Wherever possible, such scores should be reported to the client. By comparing respondents' preferences with those of others similar to them, the utility of the information is increased. For example, if teenage girls are found to respond differently from women returning to the world of work, scoring a returning woman's interests against those of a teenage reference group might well lead to a distorted picture of her interest pattern.

For many persons with special backgrounds, special norm groups will not be available. If counselors serve a great many clients with this particular background, they may find it useful to develop their own norms. While not a substitute for a randomly selected national sample, a local reference group may help deepen counselors' understanding of the particular ways in which their own clients are apt to score on the inventories they administer. Of course, the counselor must be careful; norms based on only a few cases may be highly spurious. Several hundred cases are needed to insure reliability and validity (Angoff, 1971).

**Summary of Steps for
Recommendation 6:
Reporting Scores Based on
Special Norm Groups**

1. Utilize inventories which provide norms based on similar reference groups wherever possible.
2. Report clients' scores using these norms.
3. If no such norms exist, try to develop local norms.

GUIDELINE 9: Interpretive materials for test users and respondents (manuals, profiles, leaflets, etc.) should explain how to interpret scores resulting from separate or combined male and female norm or criterion groups.

Clarification: The interpretive information should indicate what score levels are expected when individuals are scored on separate-sex or combined-sex norm or

criterion groups. Whatever form scores are reported in should be carefully explained and justified.

Rationale: Previously, when the only scores available were based on same-sex norm groups, this problem was not present, but sex bias usually was. The most serious problem was that little recognition was given to the need for a careful discussion of what the same-sex norm groups represented and, therefore, what interpretation could be made of the scores.

Many of these problems still remain. Even when females are compared to a same-sex norm group, they are really being compared to the socialization baseline represented by the norm group. That is, if a female client is being compared with a norm group which consists of women whose socialization experiences might lead them to respond in a traditionally "feminine" manner, then the interpretive materials should indicate this possibility and suggest what alternatives the counselor has in interpreting results with different types of clients—traditional and non-traditional.

The increased availability of scores based on opposite-sex and combined-sex norm or criterion groups require even more additional interpretive information. When scales have been developed separately for males and females and opposite-sex scores are available, there should be a demonstration that this is an appropriate procedure and a careful explanation of how to interpret scores for individuals scored on opposite-sex scales. For example, what would be the meaning of a male's score on a "Department Store Saleswoman" scale, or a female's score on a "Life Insurance Saleswoman" scale? Further, when scales have been developed on a criterion or norm group composed of both sexes, the manual or report format should explain possible biasing influences. For example, does a score of 50 on a "Medical" scale provide the same information for both males and females?

GUIDELINE 10: Where differences in validity have been found between dominant and minority groups (differentiated by sex), separate interpretive procedures and materials should be provided which take these differences into account.

Furthermore, interpretive materials for persons reentering paid employment or education and persons changing occupations should give special attention to score interpretation.

In the case of re-entry persons, particular attention should be given to the effects of years of sex-role stereotyping and family-career conflict, the norms on which the scores are based, and the options such individuals might explore.

Clarification: When differences have been found to exist between minority groups and dominant groups, or between special groups (e.g., people re-entering the labor force or persons changing occupations) and people-in-general, the interpretive materials should adequately explain the nature of these differences, how the scores are affected, and how they can best be interpreted. Whereas the publisher is responsible for providing information about individuals for whom the inventory was designed, e.g., adolescents, the same inventory need not contain information about all groups.

Rationale: Use of standard interpretive procedures and materials may be a highly ineffective practice for any group which differs significantly from the criterion or norm group on which the inventory was standardized. Where differences have been shown to exist, separate score distributions, validity data, and interpretive inventory results.

This need for additional information applies to all minority and special groups. It is particularly important for the increasingly large numbers of persons who are re-entering the labor force or changing occupations after several years. It is no longer impossible or impractical for a woman or man to consider starting a career at age 30 or 35. Likewise, post-retirement careers are becoming increasingly common; men and women are retiring from the military or educational institutions and seeking opportunities which may differ radically from their previous occupations. The interpretive materials should be designed to facilitate score interpretation for these as well as "typical" younger clients. In general, the burden of responsibility will be on the counselor who must select an inventory which is appropriate for the client. In some instances there may not be any which are totally appropriate. See Recommendation 6 for some suggestions and alternatives.

GUIDELINE 11: The interpretive materials should use gender-neutral terms and examples of both male and female occupational titles to avoid the impression that certain roles are sex-linked.

Example: The interpretive materials should avoid sex-linked examples and occupational titles. For example, comments and case studies should not contain the implication that all elementary school teachers are females and all mechanics are males. Moreover, titles such as "flight attendant" should be used instead of "airline stewardess" or "airline steward."

Rationale: Interpretive materials can imply that career choice is primarily a male or primarily a female endeavor or that choices of both sexes are limited to certain kinds

of occupations. An example of the first type of sex stereotyping might be the following statement: "After the test has been completed, *his* test results are sent to one of the following scoring agencies." A subtle form of the second kind of sexual stereotyping might be the use of pictorial examples to portray females as medical assistants and males as physicians. In general, it is as important for the text of the interpretive materials to be sex fair, as for the inventory itself.

GUIDELINE 12: Interpretive materials should point out the possible influence of environmental and cultural factors on the vocational interests and choices of men and women. Manuals should recommend that the inventory be accompanied by an orientation for clients dealing with these factors.

Clarification: Interpretive materials should draw attention to underlying societal expectations—e.g., early socialization, traditional sex-role expectations of society, family-versus-career conflicts, and the experience typical of women and men and members of various ethnic and social class groups—which may influence males or females to limit their career options. The manual should encourage counselors to hold orientation sessions prior to administering inventories, to aid respondents in examining stereotypic "mind-sets" toward activities and occupations and to help respondents realize that there is virtually no activity or occupation which is exclusively male or female.

Rationale: The interpretive materials accompanying an inventory can be an excellent counseling resource. At present, however, counselors must develop most interpretive materials themselves. Publishers of career interest inventories can assist by providing information on expanding opportunities for both men and women and the breaking down of the dual occupational system.

Although it may not be the publisher's responsibility to develop these orientation materials, publishers could demonstrate their concern by recommending that, when scores are interpreted, clients be made aware that all career choices are possible, regardless of gender. Further, interpretive materials that present successful and satisfied people in non-traditional roles would greatly assist the counselor in preparing effective orientation materials.

GUIDELINE 13: The manual and interpretive materials should encourage both sexes to look at *all* relevant career and educational options. Also, myths regarding sex-biased or ethnic occupational stereotypes should be dispelled and user and respondent should explore experiences in new areas of interest.

Example: All females, minority or non-minority, who score high on a "Health" scale should be encouraged to examine options such as physician, microbiologist, and virologist. Likewise, all males who score high on a "Health" scale should examine nurse and x-ray technician as well as the traditionally male health careers.

Rationale: The interpretive materials should suggest that both males and females explore the full range of career options within their highest scoring areas. Reducing stereotypic choices of educational and career opportunities often will require personal experience with non-traditional areas of potential interest. All males and females should be encouraged to sample a large variety of classroom or work experiences before deciding on a particular career path. It will probably require considerable encouragement, as well as opportunity, for many persons to take full advantage of the possibilities of exploring. The user's manual and reporting form, such as the reverse side of a profile, could be used to encourage exploration.

GUIDELINE 14: The user's manual should address possible user biases in regard to sex roles and their possible interaction with age, ethnic group, and social class, and should caution against transmitting these biases to the respondent or reinforcing the respondent's own biases. Case studies and examples presented in the interpretive materials should include men and women equally and, where applicable, include mature people as well as people from different ethnic and social groups.

Clarification: The manual should include a section for the counselor or other professional user cautioning against possible biases on the user's part that might interact with the sex, age, social, or ethnic class of the respondent, causing undue influence and invalid results.

The case studies and examples should not be limited to white middle-class situations. Other groups should be adequately presented, such as black lawyers or doctors, both male and female.

Rationale: Sex bias with respect to career choice can also be combined with expectations about what is "appropriate" for people of particular ages, ethnic groups, and social classes. Even when sex-fairness is incorporated into the career guidance approach for young, "typical" clients, the counselor may inadvertently continue to use a less sex-fair approach with "atypical" clients. Consequently, both the counselor and the client should be aware of how their own sex role stereotypes differ with special groups.

The manual and other interpretive materials can help

orient both the counselor and the client to the potential influence of sex role stereotypes in connection with other biases toward career choice. For example, respondents from low income families may feel that only non-professional careers are viable alternatives. A female re-entering the occupational world may feel that she can only pursue clerical-secretarial types of occupations. A male may feel that all dental assistants are female and so reject this occupation as a viable option for him. In general, all clients whether "typical" or "atypical" should be encouraged to consider as many career options as possible.

GUIDELINE 15: Both user's manuals and respondent's materials should make it clear that interest inventory scores provide only one kind of helpful information, and that this information should always be considered together with other relevant information in making any career decision. The possible biases of these variables should be taken into consideration, as well.

Clarification: The interpretive materials should stress other components of career exploration in addition to scores on interest inventories—e.g., skills, accomplishments, favored activities, experiences, hobbies, other test scores, and the like.

Rationale: Interest inventories are an important tool for assisting clients to develop wide-ranging career options. Counselors and other users should however be instructed to consider other variables such as skills and ability measures from other tests as sources of information to be used in career discussions. When using hobbies and previous experiences as part of the relevant information about the client, the counselor should be cognizant of the potential biases which the experiences or lack of experiences can produce. Individuals should be encouraged to daydream about careers without any limitations due to traditional role, experience, or marriage-career conflicts.

Recommendations for Interpreting Inventory Results

RECOMMENDATION 7: Scores on occupational and basic interest inventories should be used to locate broad interest areas.

In some instances in counseling a client, the counselor may find that, for a particular occupation or interest area, only one scale for the opposite sex or no scale at all is available. In such cases, a person may be limited from considering a career or a whole set of careers by the absence of the appropriate scale. This recommendation

proposes that the counselor use the available scales from these inventories—both male and female—to locate the individual's broad interests, rather than specific careers.

The grouping of occupations or specific interests into broad interest areas is not an easy task. Occupations and interests can be grouped by level—professional, skilled labor, semiskilled, etc. by industry, by job family, by broad interest area, on the basis of the personality traits involved, or on the basis of the *Dictionary of Occupational Titles* (DOT) classifications or other clustering schemes.

Certain occupational and basic interest inventories are based on a theory of vocational choice such as the sex categories proposed by Holland (1976). In these instances, identification of broad interest areas is facilitated. For example, occupations such as mathematician, physicist, optometrist, and physician may be grouped into a common interest area. These occupations include those with a strong scientific orientation and an ability to work independently, traits Holland labels Investigative. In other cases, inventories may provide scores on items or scales which may be easily cross-referenced with occupational classifications found in the DOT. Still other inventories discourage arbitrary grouping of occupations but provide a mechanism for respondents to build their own occupational classification based on their highest scores.

The counselor must be thoroughly familiar with the manual accompanying the particular inventory he or she is using in order to identify the broad interest areas reflected in the respondent's occupational or interest profile. Once these areas have been identified, it is possible to generalize to the full range of occupations corresponding to those interests. This leads to the following recommendation.

RECOMMENDATION 8: Look at all career and educational options within a broad interest area, not just at those associated with one sex group.

Once the counselor and client have located the broad area(s) in which the client's interests lie, the search for a suitable career may have only begun. Within an interest area, there may be several hundred occupations varying in both scope and level. *All too often, the administration of an inventory ends in the tentative selection of one career option—the one with which the client first entered, or the one in which he or she scored the highest—rather than a range of options uninfluenced by the client's predisposition towards sex-role stereotypes or by biases in the test themselves.* For example, a young woman client may score high on the following occupational scales, all of which are in the "artistic" area: artist, art teacher, interior decorator, musician, and

librarian. The counselor should point out that these occupations are but a sample of those to be found in her broad area of interest. There are several job families related to art, music and literature:

- Creative arts, including art education, art history and appreciation, music history, composition, and performance, English literature, and creative writing.
- Applied arts (verbal), including journalism, broadcasting, foreign languages, comparative literature, linguistics, speech.
- Applied arts (visual), including architecture, interior design, advertising, commercial art, photography, clothing and textiles, and popular entertainment.

This expanded set of options is not restricted by gender—neither journalism nor advertising are traditionally "female" jobs—nor by the level of training required for entry.

Summary of Steps for Recommendations 7 and 8: Identifying All Occupations within a Broad Interest Area

1. Identify the broad interest areas in which the client's occupational choices lie.
2. Have clients consider all occupations in that interest area, regardless of traditional sexual stereotyping, using:

- The inventory itself,
- The *Dictionary of Occupational Titles*,
- The *Occupational Outlook Handbook*,
- Any other vocational resource guides you have available.

RECOMMENDATION 9: In interpreting the results of career guidance inventories, orient clients to the possible influence of sex bias on their scores.

Just as it is important to provide an orientation to clients prior to administering the inventory, it is important to dispel myths and minimize the potential influence of sex role stereotypes in interpreting the results. The preceding recommendations have suggested

specific steps the counselor may take to reduce restrictiveness in the reporting and interpretation of a person's scores. In many cases, however, sex bias will continue to play a subtle but persistent role in the counseling process. Although changing deeply held attitudes may not be possible in the vocational guidance setting, the counselor will want to bring these attitudes into the open for discussion.

If an orientation activity has not been conducted prior to administering the inventory, one may be used to stimulate discussion prior to interpreting the client's results. If one has previously been conducted, the counselor will want to review the major points made.

Summary of Steps for Recommendation 9: Orienting Clients to the Potential Influence of Sex Bias on Inventory Results

1. Use an orientation activity to stimulate discussion if one has not been used before.
2. Review the major points covered if one has been used before.
3. Then, and only then, present the client's results.

RECOMMENDATION 10: In interpreting the results for persons with special backgrounds or interests, the counselor should be aware of the possible influence of age, ethnic group and social class, in combination with sex bias, on the respondent's scores.

As noted in Recommendation 6, the selection of appropriate inventories and reporting of suitable scores has special significance for these clients. Where appropriate inventories and reference groups (national or local) are simply not available, special care must be taken in interpreting results. This may be especially true in the case of "returning women" or older men changing careers, as age may be an important factor in measured interests.

Inventories based on external criteria usually have reference groups composed of a wide range of ages, because occupational status rather than age is used as the criterion for selection. Inventories based on internal criteria are often more restrictive in age span; high school and/or college reference groups are most often utilized. In using these inventories with older males and females, "an individualized order of preference among vocational dimensions without reference to norms... may be more useful than comparisons which are potentially affected by age differences" (Johansson, 1974). This does not suggest that ranking raw scale scores is the most appropriate solution, however. Instead

there are two alternatives: (1) rank raw scale scores which have been adjusted by dividing the raw score by the number of items on the scale, or (2) rank normed scale scores which contain a reference to some norm group which may not be appropriate. In both cases, examination of the pattern—relative position—rather than the actual level of scores may be the most appropriate method of interpreting inventory results of special interest groups when suitable norms are not provided (see Recommendation 3b). That is, the interpretation is based on how the scales are ranked, not on the level of any particular scale. When either procedure is used, the counselor will have a exercise a considerable amount of judgment in the interpretation.

Summary of Steps for Recommendation 10: Interpreting Results for Special Groups

1. Select an appropriate inventory.
2. Use and/or develop suitable norms.
3. When appropriate norms are simply not available, determine an individual's pattern of interest—ranking of interest relative to others—without reference to norms.

RECOMMENDATION 11: In assisting clients to make vocational choices, utilize all available information, remembering that inventory results represent only one source of information about a client.

Measured interests, while extremely useful in vocational counseling, should never be used alone to direct the search for a satisfying career. Aptitudes, skills, achievements, drive, demonstrated interests, and a host of other factors must be considered.

Pertinent information is often available to high school and college counselors in school records. A client's folder may contain the following: autobiographical information, results of standardized aptitude and achievement tests, course work and grades, class standing, extra-curricular activities, special honors or awards, teacher comments, tentative educational and vocational plans, etc. This pool of information should be used to help validate inventory results and expand the base upon which vocational choices are made.

Where records are incomplete or simply unavailable to the counselor, additional effort is required to ensure that inventory results are meaningful and career choices are based on more than measured interests. The counselor will want to discuss with the client his or her grades achieved, outside interests, family background

and concerns, previous career experience, tentative plans, etc.

Whether written records exist or not, the counselor may wish to begin the counseling session with a general discussion of these background characteristics prior to presenting inventory results. Such a discussion will help both counselor and client by providing a perspective in which to view the profile of interest scores.

Summary of Steps for Recommendation 11: Using all Available Information

1. Familiarize yourself with the client's records prior to the counseling session.
2. Obtain additional information in the counseling session.
3. Then, and only then, present inventory results.

RECOMMENDATION 12: Inventory results should be used to encourage freedom of choice and expand the range of options available to the client for consideration, irrespective of gender.

Becoming aware of the potential influence of sex-role stereotyping on career choice is the first step towards sex-fair utilization of career guidance inventories. Then, if the eleven preceding recommendations are followed, Recommendation 12 should follow naturally. If at the end of a career guidance programs you can answer the question, "Have I expanded the range of options available to this client for consideration, irrespective of gender?", then you will have succeeded in following this last, but most important recommendation.

Summary of Steps for Recommendation 12: Stimulating Exploration

1. Recognize the potential influence of sexual stereotyping.
2. Follow Recommendations 1-11.

A Checklist for Evaluating Career Interest Inventories

The reader should recognize by now that there is no single best inventory, nor should career interest inventories be discarded. What is important is that you know where sex bias is occurring so adjustments can be made. The checklist is designed to help you answer the following questions:

- What elements of sex-fairness does it contain?
- What elements of sex bias does it contain?

The following checklist is designed to help you assess the career interest inventories you currently use or may consider using. The checklist, which is constructed from the NIE guidelines is by no means exhaustive. It is merely designed to offer an opportunity to apply some of the facets of the guidelines to existing instruments.

I. Inventory Name _____

II. Type of Scales

Basic Interest	yes _____	no _____
Occupational Interest	yes _____	no _____
Both	yes _____	no _____

III. Item Pool

1. Are occupational titles neutral?
yes _____ no _____
2. Is generic he/she used?
yes _____ no _____
3. Are item pools common or separate?
common _____ separate _____
4. If common, are items either gender neutral or balanced in popularity by sex throughout the inventory?
yes _____ no _____

IV. Scale Construction

5. Is there a justification for common or separate scales by sex?
justified _____ not justified _____
6. Are items gender neutral or balanced within each of the common scales? (See 4 above)*
yes _____ no _____

V. Score Report

7. Are same scale titles available for both sexes?
available _____ unavailable _____
8. Do both sexes receive the same report form?
yes _____ no _____

*Look at means for females and males for each scale.

VI. Interpretive Information

9. Is there a discussion of the interpretation of sex differences?

yes no

10. Are included examples stereotypical?

no yes

11. Is the language and tone of the discussions in 9 and 10 (above) sex biased?

no yes

REFERENCES

Angoff, W.H. "Scales, Norms; and Equivalent Scores," *Educational Measurement*. Washington: American Council on Education, 1971.

Campbell, D.P. *Assessing Vocational Interests: A Manual for the Strong-Campbell Interest Inventory*. Stanford: Stanford University Press, 1974.

Campbell, D.P. *Manual for the Strong-Campbell Interest Inventory, T325 (Merged Form)*. Stanford: Stanford University Press, 1974.

Cole, N.S. "On Measuring the Vocational Interests of Women." *Journal of Counseling Psychology* 20 (1973): 105-112.

Darley, J.G. and Hagenah, T. *Vocational Interest Measurement*. Minneapolis: University of Minnesota Press, 1955.

Dictionary of Occupational Titles. U.S. Employment Service, Bureau of Employment Security.

Harmon, L.W. "Technical Aspects: Problems of Scale Development, Norms, Item Differences by Sex, and the Rate of Change in Occupational Group Characteristics." In Esther E. Diamond, editor, *Issues of Sex Bias and Sex-Fairness in Career Interest*

Measurement. Washington: National Institute of Education, 1975.

Hornaday, J.A. and Kuder, G.E. "A Study of Male Occupational Scales Applied to Women." *Educational and Psychological Measurement*, 21 (1961): 859-864.

Huth, G.M. "Measuring Women's Interests: How Useful?" *Personnel and Guidance Journal*, 51 (1973): 539-45.

Johansson, C.B. "Technical Aspects: Problems of Scale Development, Norms, Item Differences by Sex, and the Rate of Change in Occupational Group Characteristics." In Esther E. Diamond, editor, *Issues of Sex Bias and Sex-Fairness in Career Interest Measurement*. Washington: National Institute of Education, 1975.

Johansson, C.B., and Harmon, L.W. "Strong Vocational Interest Blank, One Form or two?" *Journal of Counseling Psychology* 19 (1972): 404-410.

Kuder, G.F. *General Manual for the Occupational Interest Survey, Form DD*. Chicago: Science Research Associates, 1975.

Laine, B.F. and Zytowski, D.G. "Women's Scores on the M and F Forms of the SVIB." *Vocational Guidance Quarterly* 12 (1964): 116-118.

Occupational Outlook Handbook. Washington U.S.: Government Printing Office (Revised every 2 years).

Prediger, D.J. and Cole, N.S. *Sex-Role Socialization and Employment Realities: Implications for Vocational Interest Measurement* (ACT Research Report, No. 68). Iowa City: The American College Testing Program, 1975.

Prediger, D.J. and Hanson, G.R. "Holland's Theory of Careers Applied to Women and Men: Analysis of Implicit Assumptions." *Journal of Vocational Behavior* 8 (1976): 167-184.

Super, D.C. and Crites, J.O. *Appraising Vocational Fitness*. New York: Harper and Row, 1962.